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ABSTRACT

Criterion referenced, field-tested instruments developed to assess 11th and 12th grade vocational agriculture education programs in (1) agricultural mechanics, (2) horticulture, (3) agribusiness supplies and services, and (4) farm management are presented in the document. A narrative report briefly discusses objectives; test construction; field testing, which involved administering the test to 12th grade students in 16 area vocational centers and 10 local schools; and the program's contribution to education. Appended materials make up the body of the document (314 pages) and consist of: an extensive treatment of test objectives and the mastery tests for each of the four areas, a list of schools in which field testing was done, and 24 tables giving item analysis and summary statistics for each test (42 pages). (LH)

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CRITERION-REFERENCED INSTRUMENTS FOR ASSESSMENT OF SPECIALIZED VOCATIONAL AGRICULTURE PROGRAMS

AGRIBUSINESS SUPPLIES AND SERVICES
AGRICULTURAL MECHANICS
HORTICULTURE
FARM MANAGEMENT

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
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FINAL REPORT
Project R-16-73

Research, Survey, Evaluation, and Examplary Programs
Division of Vocational Education
Ohio Department of Education

J. Robert Warmbrod, Principal Investigator

Department of Agricultural Education
The Ohio State University
Columbus, Ohio 43210

June 1974

CE 005 085

Title of Project:	Development of Instruments for Assessing the Performance Capabilities of Graduates of Vocational Agriculture Programs
Applicant Organization:	Department of Agricultural Education The Ohio State University, Columbus, Ohio
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Duration of Activity:	July 1, 1973 to June 30, 1974
Purpose of Contract:	Research program
Use of Funds:	Research in vocational education
Total State Funds Expended:	

ABSTRACT

Title of Project: Development of Instruments for Assessing the Performance Capabilities of Graduates of Vocational Agriculture Programs

Principal Investigator: J. Robert Warmbrod

Contracting Agency: Department of Agricultural Education
The Ohio State University

Amount of State Funds Expended:

Beginning and Ending Dates: July 1, 1973 through June 30, 1974

Statement of Problem: To develop and field test criterion-referenced instruments for assessment in eleventh- and twelfth-grade vocational education programs in Agricultural Mechanics, Horticulture, Agribusiness Supplies and Services, and Farm Management.

Statement of Objectives: (1) To develop and compile behavioral objectives for the four instructional programs; (2) to develop performance criteria; (3) to develop criterion-referenced instruments for the four instructional programs; and (4) to field-test the instruments.

Description of Activities: Behavioral objectives were developed for each of the four instructional programs. Items for the criterion-referenced tests were reviewed and revised by teachers and supervisors in area vocational centers and local schools. Twelve mastery tests (including a total of 934 items) were field tested with 420 students in 16 area vocational centers and 10 local schools.

Techniques of Evaluation of Objectives: Content validity of instruments was established through the use of consultants for writing and reviewing test items. The reliability of the instruments was estimated by Kuder-Richardson internal consistency coefficients. A detailed item analysis was performed for each mastery test.

Contribution to Education: The criterion-referenced instruments produced by the project are available for use in (1) assessing the effectiveness of instructional programs in schools, in regions of the state, or on a statewide basis and (2) assessing a student's level of mastery for specified units of instruction or for the entire course of instruction.

THE NARRATIVE REPORT

Problem

New instructional models in vocational education place major emphasis on the evaluation of educational programs in terms of prespecified outcomes. The models require that program outcomes be specified in terms of the behaviors, competencies, and performance capabilities expected of students completing instructional programs. Consequently, program effectiveness is measured in terms of the extent to which students completing or leaving an instructional program possess or fail to possess the behaviors and competencies specified in instructional objectives. In instructional systems of this nature, test information is not only used to evaluate program effectiveness, but can also be used to evaluate the student's mastery of instructional objectives as an aid to placing students in appropriate employment or in additional instructional situations (Glaser and Nitko, 1971). Instruments (tests) designed especially for this purpose are known as "criterion-referenced tests" (Hambleton and Novick, 1972).

Criterion-referenced tests are defined as a test "made up of items keyed to a set of behavioral objectives" (Ivens, 1970). Others have defined a criterion-referenced test as "one that is deliberately constructed so as to yield measurements that are directly interpretable in terms of specified performance standards" (Glaser and Nitko, 1971).

The major purpose of the project was to develop and field test criterion-referenced instruments for evaluating the effectiveness of specialized instructional programs in vocational agriculture. The specific purpose of the project was to develop and field test criterion-referenced instruments for assessment of eleventh-and twelfth-grade instructional programs in the following areas: Agricultural Mechanics (Agricultural Industrial Equipment and Services); Horticulture; Agricultural Supplies/Services (Agribusiness Supplies and Services); and Farm Management (Management of Production Agriculture Businesses). A majority of the students enrolled in specialized vocational agriculture programs in area vocational centers in Ohio are enrolled in these four instructional programs.

Objectives

The specific objectives of the project were:

1. To develop and compile lists of behavioral objectives for the four instructional programs--Agricultural Mechanics, Horticulture, Agribusiness Supplies and Services, and Farm Management.

2. To develop performance criteria which indicate accomplishment of specified behavioral objectives.

3. To develop criterion-referenced instruments for each of the four instructional areas.

4. To field test the instruments by administering them to twelfth-grade students enrolled during 1973-74 in the four specialized vocational education programs in local schools and area vocational centers.

Description of Activities

In developing and compiling behavioral objectives for the four instructional areas (Objective 1), the project staff collected lists of instructional objectives prepared by teachers participating in a Curriculum Development Workshop at The Ohio State University during the 1973 Summer Quarter. The Curriculum Development Workshop was directed by Dr. Richard H. Wilson, Department of Agricultural Education, The Ohio State University, and Dr. Harlan E. Ridenour, Director of the Agricultural Education Curriculum Materials Service, Division of Vocational Education, Ohio Department of Education. During the workshop teachers developed curriculum units for specialized instructional programs in vocational agriculture which included behavioral objectives for the various instructional units. The behavioral objectives developed by the workshop participants were refined and revised by William Symons, Graduate Research Associate, Department of Agricultural Education, The Ohio State University.

Drafts of statements of behavioral objectives for Agricultural Mechanics, Horticulture, and Agribusiness Supplies and Services were obtained also from the staff of the project "Career Education in Agribusiness, Renewable Natural Resources, and Environmental Protection (U.S. Department of Health, Education, and Welfare, 1974a; 1974b; 1974c). In the horticulture instructional area, work at the University of Florida (n.d.) was used in deriving behavioral objectives. In deriving behavioral objectives for the Farm Management instructional area, the project staff used the list of behavioral objectives developed by Dr. John T. Starling and Dr. Leon W. Boucher, Department of Agricultural Education, The Ohio State University.

Using the sources listed above, the project staff derived lists of behavioral objectives that were used for deriving the criterion-referenced instruments. The list of behavioral objectives are included in the appendices as follows:

Appendix A--Agricultural Mechanics
Appendix C--Horticulture
Appendix E--Agribusiness Supplies and Services
Appendix G--Farm Management

In developing criterion-referenced instruments (Objectives 2 and 3) the project staff used as guides the writings of Sullivan, Baker, and Schutz (1971) and Popham (1971). The instructional objectives listed in Appendices A, C, E, and G were used for developing items for the criterion-referenced instruments. First drafts of items were written by the project staff. A consultant staff of teachers, supervisors in vocational education planning districts, and faculty members at The Ohio State University was asked to review and revise the items developed by the project staff.

Members of the consulting staff of 16 teachers and supervisors (see the "Personnel and Facilities" section of the report) were assembled for one-day sessions at The Ohio State University to accomplish the following tasks:

1. To review and revise the items written by the project staff. The consultants were provided behavioral objectives that had been used in developing the items.

2. To indicate the correct response for each item and to review the wording of each item so that it could be read and understood by twelfth-grade students completing the specialized vocational agriculture programs.

3. To write additional items in accordance with the lists of behavioral objectives.

Following these procedures the project staff assembled criterion-referenced mastery tests for the four instructional areas--Agricultural Mechanics, Horticulture, Agribusiness Supplies and Services, and Farm Management. Copies of the mastery tests are included in the following appendices:

Appendix B--Mastery Tests	Agricultural Mechanics
Appendix D--Mastery Tests	Horticulture
Appendix F--Mastery Tests	Agribusiness Supplies and Services
Appendix H--Mastery Tests	Farm Management

A total of 934 items (302 items for Agricultural Mechanics Mastery Tests; 354 items for Horticulture Mastery Tests; 150 items for Agribusiness Supplies and Services Mastery Tests; 128 items for Farm Management Mastery Tests) was included in the criterion-referenced instruments. The list of instructional objectives (appendices A, C, E, and G) indicate the items included in each test that pertain to each instructional unit.

The field testing of the instruments (Objective 4) involved administering the instruments to twelfth-grade students in 16 area vocational centers and 10 local schools (Appendix I). Mastery tests for Agricultural Mechanics, Horticulture, Agribusiness Supplies and Services, and Farm Management were administered in area vocational centers. Mastery tests in Agribusiness Supplies and Services and Farm Management were administered in local schools offering these specialized vocational agriculture programs. Area vocational centers in which tests were administered for each instructional area were selected at random. Local schools in which tests were administered were selected from the schools within the vocational education planning districts in which area vocational centers had been selected for testing.

Letters explaining the field test and requesting permission for administering tests were sent by the principal investigator to the superintendents of area vocational center districts and local school districts that had been selected. In the case of area vocational centers, information copies of letters were sent to the directors of the area centers, local supervisors of vocational Agriculture, and teachers of the specialized programs with students involved in the field test. In the case of local schools, information copies of letters were sent to high school principals and teachers of agriculture. All schools contacted agreed to cooperate in the field test. After the initial contact requesting permission for administering tests in the schools, a member of the project staff contacted appropriate personnel in each school to make specific arrangements for testing. In area vocational centers, arrangements were made with local supervisors of vocational agriculture; in local schools, arrangements were made with vocational Agriculture teachers.

The mastery tests were administered in the schools by members of the project staff. The Agricultural Mechanics and Horticulture Mastery tests were administered on two consectuive days with local supervisors or teachers administering the tests on the second day.

Three forms of each mastery test were assembled (Appendices B, D, F, and H). Each student completed only one form of the mastery test. Forms A-1 and A-2 of the Horticulture Mastery Tests involved the use of slides for presenting the questions.

Techniques of Evaluation of Objectives

The writings of recognized authorities in the formulation of behavioral objectives and the development of criterion-referenced assessment were used in accomplishing objectives 1, 2, and 3 (Baker and Gerlach, 1971; Popham, 1971; Schutz, Baker, and Gerlach, 1971; Sullivan, Baker, and Schutz, 1971). The accomplishment of Objective 4 included item analyses for each mastery test and assessments of the validity and reliability of each mastery test.

Content validity of the mastery tests was established through procedures recommended by Kerlinger (1973). The procedures used to enhance the content validity of the criterion-referenced instruments were (1) the formulation of behavioral objectives which specify the outcomes sought by the instructional programs, (2) the development of criterion-referenced items designed to assess the student's level of mastery of the outcomes specified in the instructional objectives, and (3) the review of mastery test items by teachers and local supervisors who are experts in the four instructional areas.

The reliability of the mastery tests was estimated by calculating internal consistency coefficients. Kuder-Richardson 20 and Kuder-Richardson 21 internal consistency coefficients were calculated for each mastery test (Kerlinger, 1973; Stanley, 1964). Programs and computer facilities of the Office of Evaluation at The Ohio State University were used for calculating reliability coefficients and for the item analysis for each mastery test.

Contribution to Education

Data yielded by the item analysis of each mastery test are presented in Appendix J. The following information is presented for each item for each mastery test in Tables 1 through 12: (1) the option scored as correct; (2) the difficulty index, the percentage of students incorrectly responding to the item; (3) a point - biserial correlation coefficient indicating the extent to which response to the item is correlated with total test score; and (4) an index of the extent to which the item discriminates between students scoring highest on the test and students scoring lowest on the test. Summary statistics for the Agricultural Mechanics Mastery Tests are presented in Tables 13, 14, and 15; for Horticulture Mastery Tests in Tables 16, 17, and 18; for Agribusiness Supplies and Services Mastery Tests in Tables 19, 20, and 21; and for Farm Management Mastery Tests in Tables 22, 23, and 24 (Appendix J).

The estimates of reliability of the mastery tests yielded by Kuder-Richardson 20 internal consistency coefficients ranged from .62 to .90. Internal consistency coefficients yielded by Kuder-Richardson 21 estimates ranged from .50 to .88. Ten of the 12 mastery tests have Kuder-Richardson 20 reliability estimates of .67 or higher; seven of the 12 mastery tests have Kuder-Richardson 21 reliability estimates of .60 or higher.

The criterion-referenced instruments developed through the project are recommended for use in providing accountability information for the four specialized eleventh-and twelfth-grade instructional programs in vocational agriculture. Specifically, the instruments are recommended for use in assessing the effectiveness of instructional programs and for assessing the extent to which students have mastered the competencies specified in the instructional objectives.

Program Effectiveness. Using items selected from the 12 mastery tests, the criterion-referenced tests can be formulated to assess program effectiveness in a particular school or area vocational center and to assess program effectiveness on a regional or statewide basis. For an assessment of program effectiveness, items are selected for each instructional objective which specify the outcomes sought by the instructional program. The items selected constitute the instrument to be administered to students enrolled in or completing the instructional program. A composite of the students performance on the criterion-referenced instrument is a measure of the extent to which the objectives of the instructional program are being achieved. For a statewide assessment of program effectiveness, it is recommended that matrix sampling (Sirotnik, 1973) be used for collecting data.

Student Mastery. The items developed through the project can be used by teachers to assess the extent to which individual students have achieved the competencies specified in behavioral objectives for selected instructional units within a course or for the entire course. To assess a student's level of mastery for a particular instructional unit, the teacher would select items pertaining to the specific instructional unit. (See Appendices A, C, E, and G for items pertaining to each instructional unit.) The student's performance on this subset of items is a measure of the extent to which he or she has mastered the competencies specified in the instructional objective for the unit. Similar procedures can be followed in constructing criterion-referenced instruments for assessing a student's level of mastery for the entire course of instruction.

Criteria for Selecting Items. It is recommended that the following criteria be used for selecting items from the instruments field tested in this project: (1) select items that pertain to instructional objectives which specify the outcomes sought by the instructional program; (2) select items that have a positive discrimination index, a positive point-biserial correlation coefficient, and a positive phi coefficient; (3) select items that were answered correctly by a substantial percentage of the students--a difficulty index of 1.00 indicates that none of the students correctly answered the question; and (4) select items that have the highest point-biserial correlation coefficients indicating a relatively high degree of relationship between how a student responds to the item and the student's total score on the mastery tests--a measure of the validity of the item.

Copies of this report of the project will be distributed to the following groups: (l) local supervisors of vocational agriculture in the area vocational schools used for field tests; (2) teachers of vocational agriculture in the local schools used for field tests; (3) state supervisors of agricultural education, Division of Vocational Education, Ohio Department of Education; (4) teacher educators in Agricultural Education, The Ohio State University; and (5) teacher educators in Agricultural Education, Kent State University. The availability of the project report will be announced in a forthcoming issue of the Ag Ed News, a quarterly newsletter distributed to all teachers of agriculture in Ohio. The principal investigator of the project is available to describe the instruments and present instruction for their use to teachers of agriculture and the Joint Staff in Agricultural Education.

References

Baker, Robert L. and Gerlach, Vernon S. "Constructing Objectives of Cognitive Behavior." In Robert L. Baker and Richard E. Schutz (Editors), Instructional Product Development. New York: Van Nostrand Reinhold Company, 1971. pp. 25-64.

Glaser, R. and Nitko, A. J. "Measurement in Learning and Instruction." In R. L. Thorndike (Ed.), Educational Measurement. Washington: American Council on Education, 1971. pp. 625-670.

Hambleton, R. K. and Novick, M. R. Toward an Integration of Theory and Method for Criterion-Referenced Tests, ACT research Report No. 53. Iowa City, Iowa: The American College Testing Program, September 1972.

Ivens, S. H. An Investigation of Item Analysis, Reliability and Validity in Relation to Criterion-Referenced Tests. Unpublished Doctoral Dissertation, Florida State University, 1970.

Kerlinger, Fred H. Foundations of Behavioral Research. New York: Holt, Rinehart and Winston, Inc., 1973. pp. 442-476.

Popham, W. James. "Educational Criterion Measures." In Robert L. Baker and Richard E. Schutz (Editors), Instructional Product Development. New York: Van Nostrand Reinhold Company, 1971. pp. 1-24.

Schutz, Richard E., Baker, Robert L., and Gerlach, Vernon S. "Stating Educational Outcomes." In Robert L. Baker and Richard E. Schutz (Editors), Instructional Product Development. New York: Van Nostrand Reinhold Company, 1971, 1-24.

Sirotnik, Ken. "An Introduction to Matrix Sampling." Training Cassette in the Series on Perspectives on Recent Research, American Educational Research Association, 1973.

Stanley, Julian C. Measurement in Today's Schools. Englewood Cliffs, NJ: Prentice-Hall, Inc., 1964. pp. 150-169.

Sullivan, Howard J., Baker, Robert L., and Schutz, Richard E. "Developing Instructional Specifications." In Robert L. Baker and Richard E. Schutz (Editors), Instructional Product Development. New York: Van Nostrand Reinhold Company, 1971. pp. 65-104.

University of Florida. Project Horticulture, SDE No. 720-074, Final Report (n.d.)

U.S. Department of Health, Education and Welfare, Office of Education. Career Preparation in Agricultural Equipment and Mechanics--A Curriculum Guide for High School Vocational Agriculture. 1974. (a)

________________. Career Preparation in Agricultural Supplies and Services A Curriculum Guide for High School Vocational Agriculture. 1974. (b)

________________. Career Preparation in Ornamental Horticulture--A Curriculum Guide for High School Vocational Agriculture. 1974. (c)

PERSONNEL AND FACILITIES

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Office space and equipment utilized in the conduct of the project were provided by the Department of Agricultural Education, The Ohio State University. The University's Office of Evaluation provided computer services for item analysis of the mastery tests.

PROJECT EXPENDITURES

Title of Project: Development of Instruments for Assessing Performance Capabilities of Graduates of Vocational Agriculture Programs

Applicant Organization: Department of Agricultural Education
The Ohio State University

Beginning and Ending Rates: July 1, 1973 through June 30, 1974

Category of Expenditure	STATE FUNDS	LOCAL FUNDS	TOTAL

(To be provided at a later date per telephone conversation with Mr. Robert D. Balthaser, Assistant Director for Research, Survey, Evaluation and Exemplary Programs, Division of Vocational Education)

APPENDIX A

OBJECTIVES

AGRICULTURAL MECHANICS (AGRICULTURAL INDUSTRIAL EQUIPMENT AND SERVICES)

OBJECTIVES
AGRICULTURAL MECHANICS
(AGRICULTURAL INDUSTRIAL EQUIPMENT AND SERVICES)

A. Shop Safety Procedures

1. The student will be able to recognize and explain various shop hazardous situations and know how to correct or avoid hazardous situations.
2. The student will practice shop safety to protect himself and his co-workers from injury.
3. The student will be able to describe the advantages of shop work and practice good tool arrangement and housekeeping in the shop.
4. The student will be able to explain the use of first aid and fire equipment and the proper first aid reporting procedure.

Test Items

Form A-1, Item 1
Form B-1, Item 1

B. Laboratory Orientation and Safety Procedures

1. To acquaint students with the shop area and location of safety equipment: (a) first aid equipment; (b) fire extinguisher; (c) fire blanket
2. The student will be able to check power machinery for proper use and electrical safety: (a) wiring; (b) floor conditions.
3. The student will be equipped with proper clothing and protective equipment: (a) eye glasses; (b) foot wear; (c) clothing; (d) learn to lift properly

Test Item

Form C-1, Item 1

C. Use and Application of Single Cylinder Engines

1. Students must be able to measure the needs and uses of single cylinder engines.

2. Students will be able to demonstrate to others: (a) horse power; (b) type of shaft: (c) series of engine

Test Item

Form A-1, Item 2
Form B-1, Item 2

D. The Lubrication System and Cooling System of Single Cylinder Gasoline Engines

1. The student will be able to disassemble, service, repair, and reassemble according to the manufacturer's specifications the various types of oil systems found in small gasoline engines.

2. The ability to disassemble, service, and reassemble the components of the cooling system on small gasoline engines will be demonstrated by the student.

3. Given the parts of the lubrication system, the student will be able to identify and describe the purpose of the parts of the lubrication system.

Test Items

Form A-1, Item 3
Form B-1, Item 12
Form C-1, Item 2

E. The Carburetion System

1. Given either a 2-stroke cycle or a 4-stroke cycle single cylinder engine with malfunctions in the carburetion system, the student will be able to diagnose the nature of the malfunctions.

2. The student will be able to disassemble, repair, and reassemble according to the manufacturer's specifications the carburetor used on a single cylinder gasoline engine.

Test Items

Form A-1, Items 6, 8
Form B-1, Items 3, 5, 6, 7
Form C-1, Items 3, 4, 5, 6, 7

F. The Ignition System of Single Cylinder Engines

1. Given a single cylinder engine with malfunctions in the ignition system, the student will be able to properly diagnose the nature of the malfunction.

2. The student will be able to disassemble, service or repair, and reassemble according to the manufacturer's specifications the following parts of the ignition system: (a) breaker points; (b) coil; (c) condensor; (d) spark plug; (e) flywheel

Test Items

Form A-1, Items 2, 9, 10, 11
Form B-1, Items 8, 10, 16
Form C-1, Items 8, 9, 10
Form C-2, Item 49

G. The Compression System of Single Cylinder Engines

1. Given an engine with malfunctions in the piston, piston rings, valves, and bearings, the student will properly diagnose the nature of the malfunction.

2. The student will disassemble, repair, and reassemble according to the manufacturer's specifications the following parts: (a) piston; (b) piston rings; (c) wrist pins; (d) connecting rod; (e) connecting rod bearing; (f) valves

Test Items

Form A-1, Items 7, 12
Form B-1, Items 4, 11
Form C-1, Items 11, 12

H. Engine Block and Head

1. Given an engine with defects in the engine block or head, the student will be able to properly diagnose the nature of the malfunction.

2. The student will be able to disassemble, repair, and reassemble according to the manufacturer's specifications the following: (a) engine head; (b) head gasket; (c) cylinder sleeves

3. Given an engine block, head, and head gasket, the student will be able to describe the purpose of the parts.

Test Items

Form A-1, Items 14, 16
Form B-1, Items 14, 15
Form C-1, Items 13, 14, 15

I. The Valve System

1. The student will be able to diagnose properly the nature of the malfunction in the valve system of an engine.

2. The student will demonstrate his competency by disassembling, repairing, and reassembling according to the manufacturer's specifications the following parts of the valve system: (a) rocker arm assembly; (b) intake and exhaust valves; (c) valve guides; (d) valve seats; (e) camshaft

3. Given the parts of the valve system, the student will be able to identify and describe the function of the parts of the valve assembly.

Test Items

Form A-1, Items 13, 17
Form C-1, Items 16, 17

J. Piston and Connecting Rod Assembly

1. Given the components of the piston and rod assembly, the student will be able to identify and describe the purpose of each part.
2. Provided an engine with malfunctions in the piston, ring, and rod, the student will properly diagnose the nature of the malfunctions.
3. The student will disassemble, repair, and reassemble according to the manufacturer's specifications the following parts: (a) piston; (b) piston rings; (c) wrist pins; (d) connecting rod; (e) connecting rod bearings

Test Items

Form A-1, Items 15, 49
Form B-1, Items 9, 17

K. Crankshaft and Flywheel Assembly

1. Given an engine with malfunctions in the crankshaft and flywheel assembly, the student will be able to diagnose the nature of the malfunctions.
2. The student will exhibit his competency by disassembling, repairing and reassembling according to the manufacturer's specifications the following parts of the crankshaft and flywheel assembly: (a) crankshaft; (b) main bearings; (c) crankshaft gear; (d) flywheel; (e) ring gear
3. The student will be able to identify and verbally describe the purpose of the parts of the flywheel and crankshaft assembly.

Test Items

Form A-1, Items 18, 19
Form B-1, Items 13, 18, 19
Form C-1, Item 18
Form C-2, Item 47

L. The Oil Lubrication System

1. Provided an engine with defects in the oil lubrication system, the student will properly diagnose the nature of the malfunction.

2. The student will disassemble, repair, and reassemble according to the manufacturer's specifications the following components of the lubrication system: (a) oil pump; (b) oil filter; (c) lubrication valves; (d) oil gauge; (e) oil cooler

Test Items

Form A-1, Items 3, 20, 21
Form B-1, Items 20, 21
Form C-1, Items 19, 20, 21

M. The Cooling System

1. Provided an engine with malfunctions in the cooling system, the student will properly diagnose the nature of the malfunctions.

2. The student will disassemble, repair and reassemble according to the manufacturer's specifications the following components: (a) fan, fan belt, and radiator hoses; (b) water pump; (c) thermostat; (d) radiator

Test Items

Form A-1, Items 22, 23, 24, 25
Form B-1, Items 22, 23, 24, 25
Form C-1, Items 22, 23, 24, 25

N. The Gasoline Fuel System

1. Given a malfunctioning gasoline fuel system, the student will be able to diagnose properly the nature of the malfunctions.

2. Provided equipment with a gasoline fuel system, the student will disassemble, replace, repair, reassemble and adjust according to the manufacturer's specifications the following components of the gasoline fuel system: (a) fuel tank; (b) fuel pump; (c) carburetor; (d) fuel lines; (e) fuel filter

Test Items

Form A-1, Items 4, 5, 26, 27, 65
Form B-1, Items 26, 27, 28, 33
Form C-1, Items 26, 27, 28

O. The LP-Gas Fuel System

1. Provided an engine with malfunctions in the LP-gas fuel system, the student will properly diagnose the nature of the malfunctions.

2. The student will remove, disassemble, repair, reassemble, adjust, and/or service according to the manufacturer's specifications the following components of the LP-gas fuel system: (a) carburetor; (b) fuel lines and valves; (c) pressure regulators; (d) vaporizer regulators

Test Items

Form A-1, Items 28, 29
Form B-1, Item 29
Form C-1, Item 29

P. The Diesel Fuel System

1. Provided an engine with defects in the diesel fuel system, the student will be able to diagnose properly the nature of the defects.

2. The student will remove, disassemble, repair, reassemble, adjust and/or service according to the manufacturer's specifications the following components of the diesel fuel system : (a) injection pump; (b) injection nozzle; (c) transfer pumps; (d) fuel filters; (e) fuel lines

3. The student will demonstrate his competency by calibrating a pump and injector according to appropriate manufacturer's specifications.

Test Items

Form A-1, Items 30, 31
Form B-1, Items 30, 31
Form C-1, Items 30, 32

Q. The Electrical System

1. Supplied with agricultural equipment that has malfunctions in the electrical system, the student will be able to properly diagnose the nature of the malfunctions.

2. Provided equipment with the various components of the electrical system, the student will be able to test, remove, disassemble, replace, repair, reassemble, adjust, and/or service the following components of the electrical system: (a) charging circuit; (b) starting circuit; (c) ignition circuit; (d) lighting and accessory circuits

Test Items

Form A-1, Items 32, 33
Form B-1, Items 32, 34
Form C-1, Items 31, 33, 34

R. The Transmission System

1. Provided an item of equipment with malfunctions in the transmission system, the student will be able to properly diagnose the nature of the malfunction.

2. Provided an item of equipment with malfunctions in the transmission system, the student will be able to repair or replace shift linkage, check end play on gears and shafts, check gear backlash, pre-load the gear train and test the operation of the transmission according to the manufacturer's specifications.

3. Given equipment with a transmission in need of service, the student will be able to properly drain and refill the transmission.

4. The student will demonstrate his competency by disassembling, repairing, and reassembling according to the manufacturer's specifications the following parts of the transmission: (a) input shaft; (b) main shaft; (c) counter shaft; (d) reverse idler shaft

5. Given the parts of the transmission the student will be able to identify and describe the function of the parts of the different shafts.

Test Items

Form A-1, Items 34, 35
Form B-1, Item 35
Form B-2, Item 1
Form C-1, Item 35
Form C-2, Item 1

S. The Clutch System

1. Provided equipment with defects in the clutch system, the student will be able to properly diagnose the nature of the malfunction.

2. Provided equipment with a clutch system, the student will be able to remove, inspect, repair, reassemble, and install and/or service the following components of the clutch assembly: (a) clutch linkage; (b) springs; (c) clutch plate; (d) clutch disk; (e) pilot bearing and release bearing; (f) clutch shaft

Test Items

Form A-2, Items 1, 2
Form B-2, Items 2, 3
Form C-2, Items 2, 3

T. The Differential, Final Drive Assembly and Axle Assembly

1. Provided equipment with defects in the differential and final drive assembly, the student will be able to properly diagnose the nature of the defects.

2. Given equipment with a differential and final drive assembly, the student will be able to drain, flush, and refill the rear-axle housing according to the manufacturer's specifications.

3. Given equipment with a differential and final drive assembly, the student will be able to remove, install, and test the operation of the differential and various types of final drives.

4. The student will be able to disassemble, repair, adjust, and reassemble: (a) ring and pinion gear assembly; (b) pinion shaft; (c) side gears; (d) axle gears; (e) differential bearings

Test Items

Form A-2, Items 3, 4, 5, 6
Form B-2, Items 4, 6
Form C-2, Items 4, 5, 6

U. The PTO Assembly

1. Provided equipment with defects in the power take-off, the student will be able to properly diagnose the nature of the defects.
2. Provided equipment with a power take-off assembly, the student will be able to remove, repair and/or service, and install the power take-off.
3. Provided equipment without safety shields for the power take-off assembly, the student will be able to replace safety shields as recommended by the manufacturer.
4. The student will disassemble, repair and reassemble according to manufacturer's specifications the following components: (a) input shaft couplings; (b) clutch shaft; (c) engine clutch assembly; (d) output shaft

Test Items

Form A-2, Item 7
Form B-2, Item 5
Form C-2, Item 7

V. The Braking System

1. Given equipment with malfunctions in the brake system, the student will be able to correctly diagnose the nature of the malfunction.
2. Provided equipment with a brake system, the student will be able to remove, disassemble, repair, reassemble, adjust, and/or service according to the manufacturer's specifications the following components of the braking system: (a) brake pedal and linkage; (b) brake lines; (c) brake drum, disks, and shoes; (d) brake bands; (e) brake adjusters; (f) brake springs

Test Items

Form A-2, Item 8
Form B-2, Item 7
Form C-2, Item 8

W. The Steering System

1. Provided equipment with malfunctions in the steering mechanism, the student will be able to correctly diagnose the nature of the malfunction.

2. Given equipment with a steering mechanism, the student will be able to remove, disassemble, repair, install, adjust, and/or service the steering mechanism.

3. Given equipment with a steering mechanism, the student will be able to adjust alignment and toe-in.

Test Items

Form A-2, Item 9
Form B-2, Item 8
Form C-2, Item 9

X. The Hydraulic System

1. Given equipment with malfunctions in the hydraulic system, the student will be able to correctly diagnose the nature of the malfunction.

2. Provided equipment with a hydraulic system, the student will be able to remove, disassemble, repair, reassemble, adjust, and/or service according to the manufacturer's specifications the following components of the hydraulic system: (a) hydraulic pump; (b) hydraulic cylinder; (c) hydraulic valves; (d) reservoir, filters, and oil cooler; (e) lines and fittings; (f) motor

Test Items

Form A-2, Items 10, 11, 12, 13, 14, 15
Form B-2, Items 9, 10, 11, 12, 13, 14
Form C-2, Items 10, 11, 12, 13, 14

Y. Hydraulic Hose and Fittings

1. Provided with the design and specifications of a hydraulic system the student will be able to choose the proper hose and fittings.

2. The student will be able to identify and properly assemble the following items: (a) types of fittings; (b) sizes of fittings; (c) types of hose; (d) sizes of hose

Test Items

Form A-2, Item 16
Form B-2, Item 15

Z. The Air Conditioning System

1. Provided equipment with an air conditioning system, the student will be able to test the system and diagnose the nature of the malfunctions in the system.

2. Provided equipment with an air conditioning system, the student will be able to remove, replace, and/or service the following parts of the air conditioning system: (a) compressor; (b) condensor; (c) evaporator; (d) circuits and valves; (e) dehydrator

3. The student will be able to remove condensation and fill with refrigerant.

Test Items

Form A-2, Items 17, 18, 19
Form B-2, Items 16, 17, 18, 19
Form C-2, Items 15, 16, 17, 18

AA. Wheels, Tires, and Tracks

1. Given equipment with a wheel and tire assembly, the student will be able to remove, disassemble, repair, and install the wheel and tire assembly.

2. Given equipment with a track assembly, the student will be able to remove, replace, and adjust the track.

3. Provided equipment with wheel bearings and seals, the student will be able to remove, inspect, service, adjust and/or replace wheel bearings and seals.

4. Provided the equipment, the student will be able to add either metal or liquid wheel weights in the proper location.

Test Items

Form A-2, Items 20, 21
Form B-2, Items 20, 21
Form C-2, Items 19, 20, 21

BB. Assembly, Adjustment, Operation, Repair, and/or Service of Tillage Equipment

1. Provided with a manual and the proper types of equipment and parts, the student will be able to assemble and make the initial adjustments on tillage equipment.

2. Provided various types of tillage equipment, the student will be able to service the equipment for pre-delivery according to the directions in the service manual.

3. Given various types of tillage equipment not performing satisfactorily in the field, the student will be able to make minor adjustments and repairs to correct conditions that cause unsatisfactory field performance.

Test Items

Form A-2, Items 22, 23, 24, 25
Form B-2, Items 22, 23, 24, 25
Form C-2, Items 22, 23, 24, 25, 26

CC. Assembly, Adjustment, Repair and/or Service of Planting Equipment

1. Given a manual and the proper types of equipment and parts, the student will be able to assemble and make the initial adjustments on planting equipment.
2. Provided various types of assembled planting equipment, the student will be able to service the equipment for pre-delivery according to the specifications in the service manual.
3. Provided various types of planting equipment, not operating satisfactorily in the field, the student will be able to make minor adjustments and repairs to correct the conditions on the equipment that cause unsatisfactory field performance.

Test Items

Form A-2, Items 26, 27, 28
Form B-2, Items 26, 27, 28
Form C-2, Items 27, 28

DD. Assembly, Adjustment, Repair and/or Service of Spraying and Dusting Equipment

1. Provided a manual and the proper types of equipment and parts, the student will be able to assemble and make the initial adjustments on spraying and dusting equipment.
2. Provided various types of spraying and dusting equipment, the student will be able to service the equipment for pre-delivery according to the specifications in the service manual.
3. Provided various types of spraying and dusting equipment, not performing satisfactorily in the field, the student will be able to perform minor adjustments and repairs to correct the defects in the equipment that cause unsatisfactory field performance.

Test Items

Form A-2, Items 29, 30, 31
Form B-2, Items 29, 30, 31
Form C-2, Items 29, 30, 31

EE. Assembly, Adjustment, Repair and/or Service of Harvesting Equipment

1. Given a manual and the proper types of equipment and parts, the student will be able to assemble and make the initial adjustments on harvesting equipment.

2. Provided various types of harvesting equipment, the student will be able to service the equipment for pre-delivery according to the manufacturer's specifications.

3. Provided various types of harvesting equipment, not performing satisfactorily in the field, the student will be able to perform minor adjustments and repairs to correct the defects in the equipment that cause unsatisfactory performance.

4. Presented with various types of harvesting equipment to be delivered, the student will be able to load, unload, and discuss with the customer appropriate operating and maintenance procedures for the harvesting equipment to the satisfaction of the customer and dealer.

Test Items

Form A-2, Items 32, 33, 34, 35, 36, 37, 38, 39, 43, 44, 45, 48
Form B-2, Items 32, 33, 34, 35, 36, 37, 38, 39, 43, 44
Form C-2, Items 32,33, 34, 35, 36, 37, 38, 39, 40, 44, 45

FF. The Assembly, Adjustment, Repair and/or Service of Materials Handling and Labor Saving Equipment

1. Provided a manual and the proper type of equipment and parts, the student will be able to assemble and make the initial adjustments on materials handling and labor saving equipment.

2. Provided various types of materials handling and labor saving equipment, the student will be able to service the equipment for pre-delivery or pre-installation according to the specifications in the service manual.

3. Provided various types of materials handling and labor saving equipment, not performing satisfactorily in the field, the student will be able to perform minor adjustments and repairs to correct the defects in the equipment that cause unsatisfactory field performance.

4. Given various items of materials handling and labor saving equipment for delivery, the student will be able to load and unload the equipment and instruct the customer on the operation and maintenance of the equipment to the satisfaction of the customer and dealer.

Test Items

Form A-2, Item 46
Form C-2, Item 41

GG. Oxyacetylene Welding and Cutting

1. Provided the appropriate oxyacetylene welding equipment and pieces of steel or cast iron of various thickness, the student will be able to cut steel or cast iron to the satisfaction of the teacher.

2. Provided the appropriate oxyacetylene welding equipment, the student will be able to properly connect and inspect the oxyacetylene welding equipment and light, adjust, and turn-off the flame to the satisfaction of the teacher.

3. Provided the appropriate oxyacetylene welding equipment and pieces of steel or cast iron of varying thickness, the student will be able to braze (bronze weld) the metals using the appropriate rod and flame adjustment to the satisfaction of the teacher.

4. Provided the appropriate oxyacetylene welding equipment and various pieces of steel or cast iron, the student will be able to fusion weld the metals by either using a filler rod or not using a filler rod to the satisfaction of the teacher.

5. Given the appropriate oxyacetylene welding equipment and pieces of steel that need to be heated and bent to fit a specific given situation, the student will be able to heat and bend the metal to meet the specifications given.

Test Items

Form A-2, Items 47, 55
Form B-2, Item 42
Form C-2, Items 42, 43

HH. Hand and Power Tools and Hardware Used in Agricultural Equipment and Mechanics

1. Given various kinds of hand and power tools used in agricultural equipment and mechanics, the student will be able to correctly identify the tools and describe their uses using proper tool nomenclature at a level of performance established by the teacher.

2. Presented various kinds of hardware commonly used on agricultural equipment, the student will be able to correctly identify the hardware by using the proper nomenclature and describe the use of the hardware at a level of performance acceptable to the teacher.

3. Provided equipment requiring the use of various tools and/or hardware in order to repair or service the equipment, the student will be able to select the proper tools and/or hardware to complete the service or repair and use the tools and hardware at a level of performance acceptable to the teacher.

4. Presented selected items of tools in need of repair or requiring general maintenance, the student will be able to make such repairs or perform such general maintenance procedures to a level of performance acceptable to the teacher

5. Provided selected tools and power equipment, the student will exhibit safe operating procedures for the various tools to the satisfaction of the teacher or an employer.

Test Items

Form A-2, Items 40, 41, 42, 50, 51, 52
Form B-2, Items 45, 46, 47, 48, 50, 51, 56, 59
Form C-2, Items 46, 48

II. Electric Welding in Agricultural Equipment and Mechanics

1. Provided various types of materials to be welded, the student will be able to correctly identify the metal by sight, by feeling, and/or by using the spark test.
2. Presented with various welds that are defective, the student will be able to determine whether the defective weld was caused by improper arc length, improper current setting, improper speed of travel, improper electrode angle, improper electrode, improperly prepared metal or a combination of these factors and follow procedures to correct for these sources of defects.
3. Given the metals to be welded and appropriate welding equipment, the student will exhibit safe operating procedures for arc welding to the satisfaction of the teacher or an employer.
4. Given the metals to be welded and appropriate welding equipment, the student will be able to weld the metals to be joined while minimizing distortion.
5. Given metals to be welded and the appropriate welding equipment, the student will be able to make lap, fillet, and butt welds in the flat position, horizontal, vertical, and overhead positions.

Test Items

Form A-2, Items 53, 54, 56
Form B-2, Items 52, 53, 54, 55
Form C-2, Items 50, 51, 52, 53, 54, 55

JJ. Loading and Unloading Agri-Industrial Material

1. The student will be able to set up and knock down machinery.
2. The student will be able to load, unload, and transport machinery.

Test Items

Form A-2, Items 57, 58
Form B-2, Items 40, 41, 57, 58
Form C-2, Items 56, 57, 58

KK. Power Metal Working Equipment

1. The student will cut metal, grind metal, drill holes in metal and bend to shape for fabrication using: (a) power backsaw; (b) bench grinder; (c) drill press; (d) hydraulic press
2. Provided a broken machine the student will repair using the above power tools.

Test Items

Form A-2, Items 59, 60
Form B-2, Item 49
Form C-2, Item 59

LL. Painting and Refinishing Equipment

1. Provided a used piece of equipment, the student will properly clean, prime and repaint.
2. Provided a new piece of equipment the student will properly clean, sand, prime, and repaint to like new condition using spraying equipment.

Test Items

Form A-2, Items 61, 63
Form B-2, Items 60, 61
Form C-2, Item 60

MM. Safety and Sanitation Practices in Agricultural Equipment and Mechanics

1. When working in the school facility or on the job, the student will exhibit to the satisfaction of the teacher and/or employer proper personal safety precautions such as personal dress, cleanliness, and work habits.

2. When asked to lift and transfer various objects, the student will exhibit proper methods of lifting and carrying to the satisfaction of the teacher or employer.

3. When asked to use various cleaning agents, the student will exhibit adequate safety precautions as established by the teacher or employer in working with such agents.

4. When asked to work on a job that requires special ventilation precautions be observed, the student will be able to follow appropriate procedures to insure that proper ventilation is provided for the job.

5. When confronted with various types of fires, the student will be able to take appropriate action to completely extinguish the fire.

6. When working in the school shop or while employed in industry, the student will inspect and adjust safety shields or other devices on shop equipment prior to using the equipment to meet the approval of the teacher or employer.

7. When working in the school shop or while employed in industry, the student will be able to inspect the electrical system and follow safety precautions in using electrical equipment and tools to the satisfaction of the teacher or employer.

Test Items

Form A-2, Items 62, 64
Form B-2, Items 62, 63
Form C-2, Items 61, 62

NN. Planning Water Drainage Needs

1. Students will be able to read land-use capability maps and adequately determine drainage needs.
2. Students will be able to diagram various layout arrangement.
3. Students will be able to list the types and relative costs of various drainage systems.

Test Items

Form C-2, Items 63, 64, 65, 66, 67

APPENDIX B

MASTERY TESTS

AGRICULTURAL MECHANICS (AGRICULTURAL INDUSTRIAL EQUIPMENT AND SERVICES)

Form A-1
Form A-2
Form B-1
Form B-2
Form C-1
Form C-2

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FORM A-1

AGRICULTURAL MECHANICS MASTERY TEST

1. If chemical spray material comes in contact with the body

   A. wash off contact area immediately with water
   B. wash off contact area immediately with diesel fuel
   C. wash off contact area immediately with water and detergent
   D. don't worry about it--it won't hurt

2. If you are working with an engine that you know nothing about other than it does not work, what would you do?

   A. Make sure you have all your tools together
   B. Replace the spark plug with a new one
   C. Adjust the carburetor to the setting in the repair manual
   D. Follow trouble shooting procedures

3. The lubrication of moving parts in a 4-cycle engine is accomplished by

   A. fins on the flywheel
   B. an oil mixture in the fuel
   C. a method of splashing or pumping oil around or upon parts
   D. oil circulating all through the oil bath type air cleaner

4. One of the things a carburetor must do is

   A. slow the engine speed down if it goes too fast
   B. mix fuel with air in proportion
   C. provide the thing you put your foot in
   D. leave no flat spots

5. The air fuel mixture (ratio) in a normally operating engine under full load is controlled by the

   A. adjustment of carburetor jets
   B. restriction of air by the choke
   C. float valve in the carburetor
   D. none of the above

6. Sometimes in attempting to start a small engine it "floods out" and will not start (when not choked). The most probable cause of this trouble may be

   A. a restricted air intake
   B. a plugged jet in the carburetor
   C. a sediment bowl full of water
   D. a faulty crankcase breather

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7. In checking over a 4-cycle engine when you turn the engine over slowly compression gas is heard escaping during the

A. compression stroke, indicating that there is a problem with either the piston ring (s) and/or piston
B. intake stroke, indicating that there is a problem with the valves
C. compression stroke, indicating that there is a problem with the valves
D. intake stroke, indicating that a piston ring may be defective

8. If in checking an engine "flooding" is suspected, it can be verified by removing the spark plug and determining

A. if the plug has burnt electrodes
B. if the plug is wet with oil
C. if the plug gap is too wide
D. if the plug is wet with fuel

9. If in checking an ignition system on a small engine the coil tests ok but there is no spark at the spark plug terminal, the most likely source of the trouble would be

A. the coil, because tests sometimes fool you
B. a short in the primary coil
C. a grounded condition in the system
D. a bad spark plug

10. On a Briggs and Stratton small engine spark timing is regulated by the

A. spark plug gap
B. governor setting
C. location of the condensor
D. breaker points opening

11. For every revolution that the crankshaft makes in a 2-cycle engine, the breaker points open

A. once every revolution
B. once every two revolutions
C. once every other revolution
D. once every three revolutions

12. In order to provide a good seal for compression within the cylinder, the piston

A. is equipped with compression ring (s)
B. is tapered so that it works like a cork in a bottle
C. is equipped with an oil ring which seals off the small air gaps with oil
D. is tightly fitted so no fuel or gas can escape even if no piston rings were used

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13. When a 4-cycle engine is on the compression stroke, the valves are in the

A. open position
B. closed position
C. only the intake is in the open position
D. only the exhaust is in the open position

14. An engine cylinder diameter is measured in at least

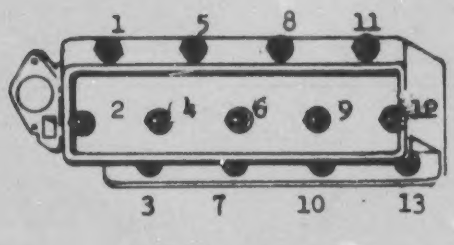
A. 6 places
B. 8 places
C. 10 places
D. 12 places

15. The clearance between the piston and the cylinder wall provides for

A. expansion of metals
B. space for air-fuel mixture to enter cylinder
C. prevention of over compression
D. blow by

16. Which of the following is the recommended sequence for torquing a cylinder head on a tractor?

A.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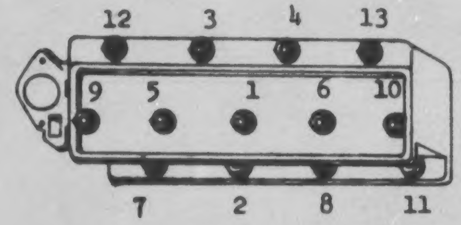
C.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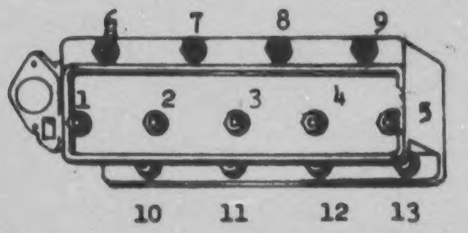
B.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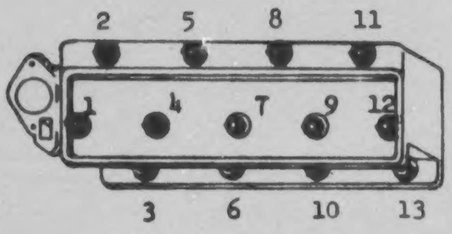
D.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17. Most small engines manufactured today have valve faces which are ground at a

- A. 60° angle
- B. 40° angle
- C. 50° angle
- D. 45° angle

18. Plasti-gage is used in checking

- A. flywheel clearance
- B. crankshaft bearing clearing
- C. piston diameter
- D. cylinder taper

19. Some engine flywheel keys are made of special metal to

- A. shear and prevent engine damage
- B. prevent shearing during excessive loads
- C. fit the slot in the flywheel
- D. none of the above

20. The pressure developed by tractor oil pumps is normally between

- A. 5 and 15 lbs
- B. 15 and 60 lbs
- C. 55 and 60 lbs
- D. 60 and 100 lbs

21. If a tractor has low oil pressure, which of the following things probably could have caused it?

- A. Clogged breather
- B. Worn oil pump drive
- C. Oil pump pick-up screen plugged
- D. Oil pump by-pass valve stuck closed

22. Small single cylinder gasoline engines are generally

- A. water cooled
- B. combined water and air cooled
- C. air cooled
- D. none of the above

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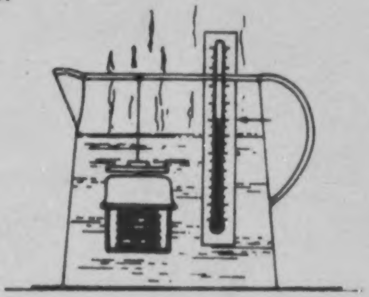
23. When using the procedure shown in this picture, which of the following is the mechanic testing about the cooling system?



A. Thermostat
B. Pressure cap
C. Anti-boiling condition
D. Cooling system efficiency

24. Pressurized radiator caps are used

A. to keep the water in the radiator
B. to increase the water volume
C. to increase the boiling temperature of the water
D. to keep foreign material from getting inside

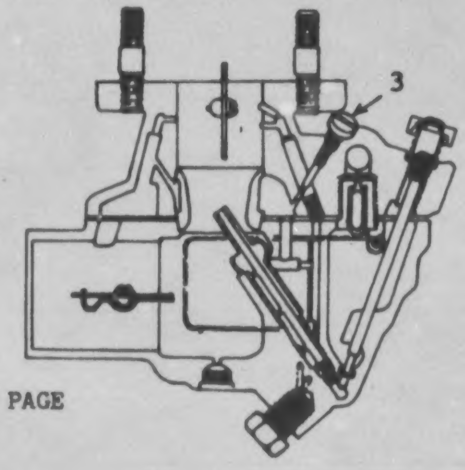
25. Which of the following would cause a tractor engine to overheat?

A. Freeze plugs too tight
B. Improperly timed engine
C. Using nondistilled water
D. Long periods of idle speed operation

26. When checking the fuel system on a gasoline tractor, you notice it is running very rough during idle. This is probably caused by

A. the idle adjustment set too high
B. the idle adjustment set too low
C. dirt in the idle circuitry
D. all of the above could be a cause

27. From this diagram of the cross section of a carburetor, number 3 is



A. the needle valve
B. the idle adjusting screw
C. the main meter jet
D. the high speed adjustment screw

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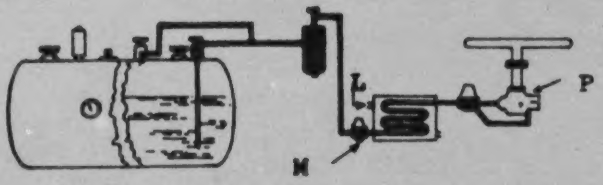
28. From this drawing of an LPG fuel system, letter L is where the

A. air cooler is attached
B. filter is attached
C. hot water enters
D. cold water enters

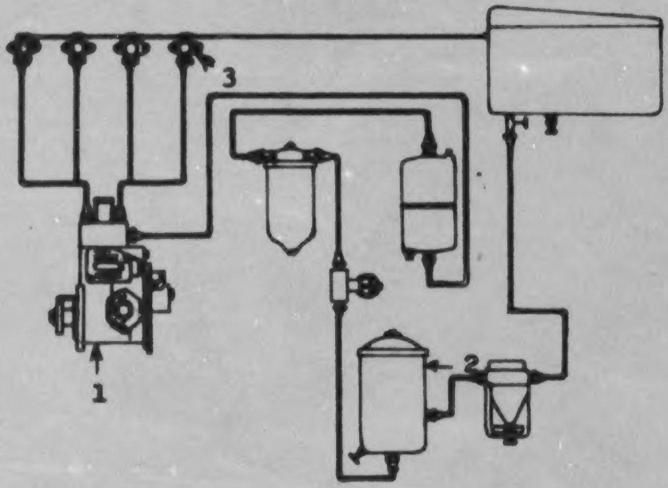


29. From this same drawing of an LPG fuel system above, letter P is the

A. carburetor
B. control valve
C. atomizing valve
D. vaporizing unit

30. From this diesel fuel system diagram, the part labeled number 1 is

A. a compressor
B. an injection pump
C. a distributor
D. a governor



31. In diesel engines, knocking is caused by the fuel igniting too fast.

A. true
B. false

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32. A newly assembled tractor engine backfires. Which of the following would you check out first as a possible cause of this malfunction?

- A. One spark plug wire bad
- B. Cracked distributor cap
- C. Battery voltage too high
- D. Improper firing order

33. The engine will not start and there is no high tension spark coming from the coil. Which of the following would you check out first as a possible cause of this malfunction?

- A. Spark plugs bad
- B. Points not adjusted properly
- C. Distributor cap broken
- D. Carburetor

34. The transmission is hard to shift into gear. Which of the following would you diagnose as a possible cause of this malfunction?

- A. Shifter fork bent
- B. Bearings worn
- C. Lubricant level too high
- D. All of the above

35. When the transmission is leaking oil, which of the following situations would probably not be the cause?

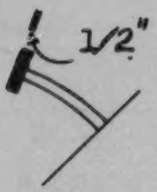
- A. Gaskets missing or damaged
- B. Drain plug loose
- C. Gears worn or broken
- D. Transmission case cracked

FORM A-2

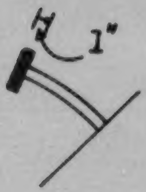
AGRICULTURAL MECHANICS MASTERY TEST

1. Which of the following drawings best represents a clutch that is properly adjusted?

A.



B.



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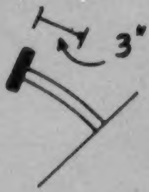

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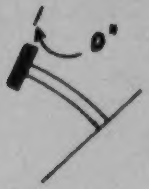
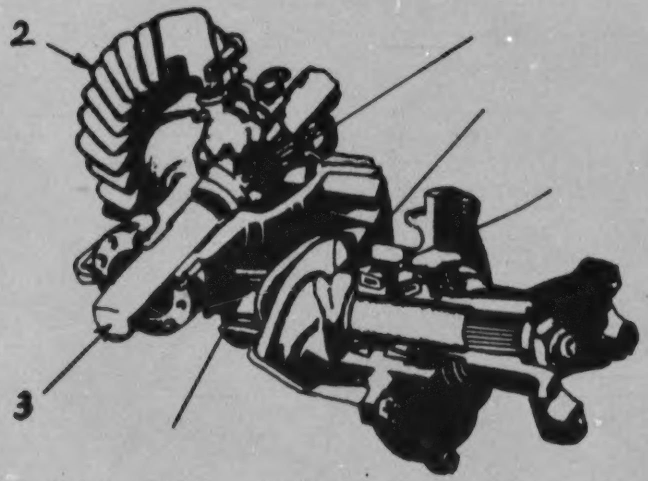


2. You are plagued with a problem of rapid clutch disk-facing wear. Which of the following is the probable cause?

A. "Stiff" clutch pedal
B. "Riding" the clutch
C. Throw out bearing worn out
D. All the above

3. From this drawing of a differential assembly, number 3 represents the

A. drive shaft
B. input shaft
C. axle shaft
D. none of the above



4. From this same drawing of a differential assembly, shown above, number 2 represents the

A. planetary gear
B. spider gear
C. pinion gear
D. ring gear

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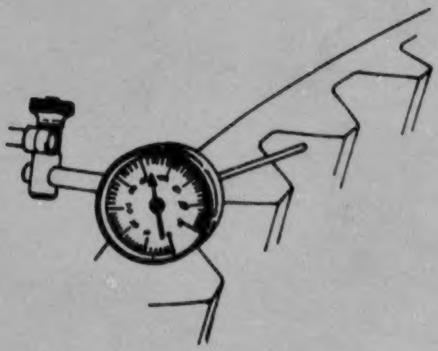
5. This tool is used in rebuilding differentials. It is called a

   A. dial indicator
   B. micrometer guage
   C. depth micrometer
   D. degree guage



6. In the procedure pictured above, the tool is being used to measure which of the following?

   A. Tooth contact
   B. Backlash
   C. Depth of tooth
   D. Angle

7. Which of the following best describes a continuous running PTO?

   A. Has its own clutch separate from the main engine clutch
   B. Can only operate when differential is turning
   C. Can be operated even though main power train is disengaged
   D. None of the above

8. Hydraulic type brakes must be serviced regularly to maintain safe stopping distances. The purpose of bleeding the brakes is to remove

   A. water from the system
   B. air from the system
   C. mineral oil from the system
   D. excess brake fluid from the system

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9. Most power steering pumps on tractors are serviced with which of the following lubricants

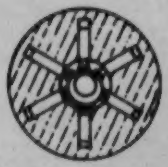
A. 90 Wt. gear grease
B. 30 Wt. gear grease
C. lubricating gear grease
D. hydraulic oil

10. The cylinders are operating too slow on a front end loader. Which of the following is not a probable cause of the malfunction?

A. Relief valve setting too high
B. Air in system
C. Relief valve setting too low
D. Internal leakage in actuating cylinders

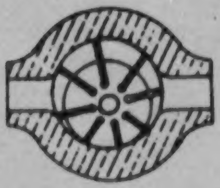
11. This drawing best illustrates

A. an axial piston pump
B. an internal gear pump
C. a rotor pump
D. a piston pump



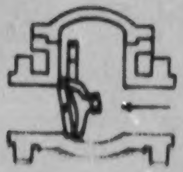
12. This drawing best illustrates

A. a rotor pump
B. a vane pump
C. an axial piston pump
D. an internal gear pump



13. This drawing illustrates

A. an air vent valve
B. a gate valve
C. a rotary valve
D. a flapper valve



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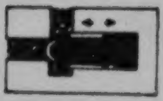
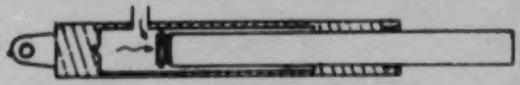
14. This drawing best illustrates



A. a spool valve
B. a check valve
C. a cock valve
D. an air vent

15. Which of the following types of hydraulic cylinders would you choose to tilt the bucket on a front-end loader?

A.



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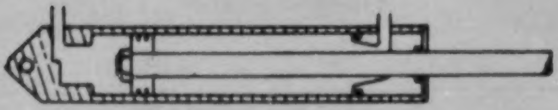

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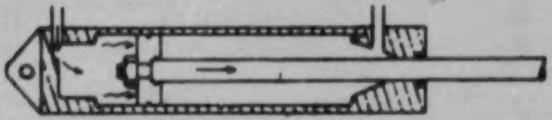

D. none of the above

16. When selecting hoses for a hydraulic pump, which of the following statements is correct?

A. Intake hose must be larger
B. Outlet hose must be larger
C. Both intake and outlet hoses must both be the same size
D. Doesn't really matter

17. The high side service valve on the air conditioning compressor leads to the

A. condensor
B. evaporator
C. compressor valve
D. drier valve

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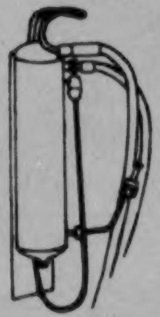
18. The function of this unit in an air-conditioning system is

A. to be a receiver-dryer
B. to pump the refrigerant
C. to condense the refrigerant
D. none of the above

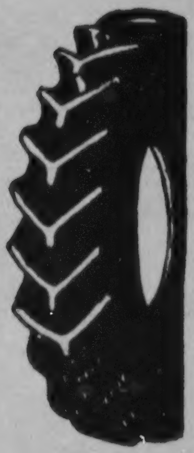


19. This unit is used in air-conditioning systems to

A. evaporate
B. condense
C. expand
D. none of the above

20. The tread design shown in this illustration is called

A. deep vee
B. Y track
C. herringbone
D. cultivator



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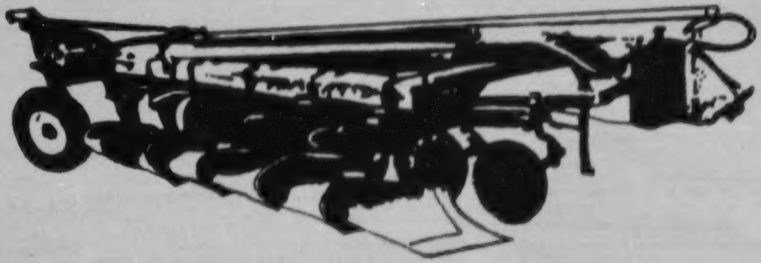
21. To remove a set of tracks from a crawler type tractor, the first thing that must be done is to

    A. drive out the master pin or link
    B. cut one grouser in half
    C. loosen track
    D. remove drive sprocket

22. The implement shown below is a

    A. disk harrow
    B. disk plow
    C. moldboard plow
    D. 2-way rollover plow



23. The "horizontal line of draft" is an important consideration in setting up the implement shown above. The "horizontal line of draft" is

    A. line of pull from the left (or rear plow) side to the tractor hitch
    B. line of pull from the center of the load of the plow to the tractor hitch
    C. line of pull from the right (front plow) side plow load to the tractor hitch
    D. horizontal from front to rear of plow

24. When field adjusting flexible disk harrows, you should

    A. select a level portion of the field and operate with the disk penetrating at a satisfactory depth.
    B. stop forward motion with the disk gangs in the ground
    C. check levelness of each gang with a carpenters level and adjust the pressure devices if necessary
    D. all the above

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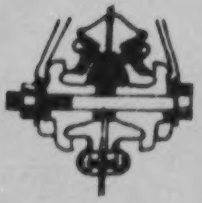
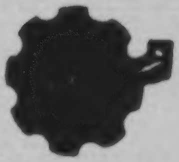
25. The coulter bearing shown below is

A. an anti-friction roller bearing
B. a chilled cone bearing
C. a single sleeve bearing
D. a double sleeve bearing



26. The rolling coulter shown below

A. makes penetration easier
B. reduces the force required to pull a plow
C. aids in trash coverage
D. reduces side draft on the plow



27. One method of classifying grain drills is according to type of seed metering mechanism used. Which of the following classifies grain drills correctly on the above basis?

A. Hoe and disk
B. Speed and volume
C. Star wheel and double disk
D. Double-run and fluted force feed

28. Erratic seed spacing by a corn planter may be caused by

A. slipping chain
B. improper planter spacing
C. disk openers adjusted too close
D. slipping ground wheel

29. If you want to spray weed killer on pasture with a boom sprayer

A. use cone type nozzles and a pressure of 25 to 40 PSI
B. use cone type nozzles and a pressure of 125 to 150 PSI
C. use fan type nozzles and a pressure of 25 to 40 PSI
D. use fan type nozzles and a pressure of 125 to 150 PSI

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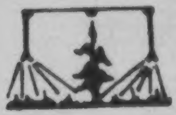
30. Spray volume per minute may change due to

    A. worn nozzle tips
    B. increased ground speed
    C. decreased ground speed
    D. amount of chemical in tank

31. The nozzle arrangement shown below is best described as

    A. complete overtop coverage for weeds or insect and between narrow rows for weed control
    B. between rows for weed control
    C. over and between rows for insect control
    D. between rows for control of insects



32. If the gatherer throat opening on the corn picker is too wide, which of the following may be the result

    A. increased machine draft
    B. loss of ear corn and shelled corn
    C. increased wear on parts
    D. none of the above

33. For efficient operation snapping rolls on a corn picker generally have an adjustment range from

    A. 1/16" to 4 1/4"
    B. 1/2" to 1 1/4"
    C. 1" to 3"
    D. 3" to 6"

34. The standard rotation rate of the tractor PTO while picking corn is

    A. 1000
    B. 700
    C. 800
    D. 360

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35. The purpose of the stripper plates or bars over the snapping rolls or blade rolls on corn heads is to

A. reduce stone damage to rolls
B. help guide the stalks through the rolls
C. prevent the corn ear from touching the blade rolls
D. none of the above

36. Loss of corn at the gathering unit of a corn picker may be caused by?

A. Insufficient PTO speed
B. Excessive snapping roll speed
C. Cutter bar out of register
D. Dull knives

37. In a tractor mower that has proper cutterbar alignment when cutting the

A. pitman is at right angles to the crank pin
B. cutterbar is aligned with the rear axle of the tractor
C. guards are all lined up with the knife
D. pitman is aligned with the knife

38. The losses per acre of wheat from a combine are as follows:
cutterbar 10 lbs.; cylinder 14 lbs.; straw rack 30 lbs.; cleaning shoe 12 lbs.
Which of the following would be most likely to reduce the total loss?

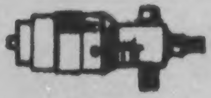
A. Lower the cutterbar and increase the forward speed
B. Lower the cutterbar and open the sieves
C. Increase forward speed and decrease cylinder clearance
D. Reduce forward speed

39. Which of the following is probably not a cause of poor cleaning while combining?

A. Sieve openings too large
B. Elevators clogged
C. Cutter bar set too high
D. Sieves overloaded and straw chopped too fine

40. The tool shown in this illustration is

A. an inside micrometer
B. an outside micrometer
C. a revolutions counter
D. none of the above



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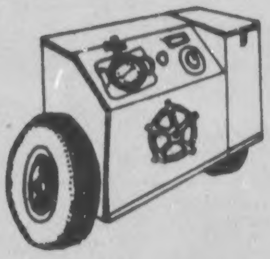
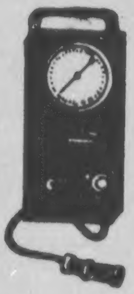
41. The piece of equipment shown is?

A. A hydrometer
B. A dynanometer
C. An injection pump tester
D. None of the above



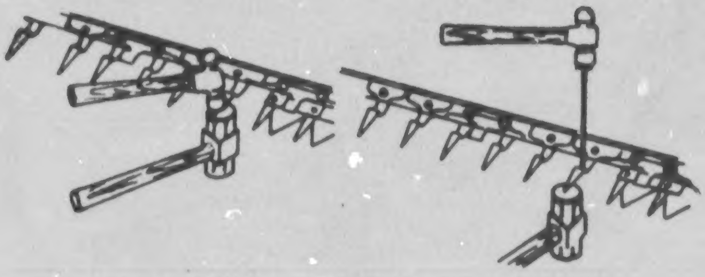
42. The piece of equipment shown in this illustration is

A. an oil tester
B. a radiator tester
C. an injector nozzle tester
D. none of the above



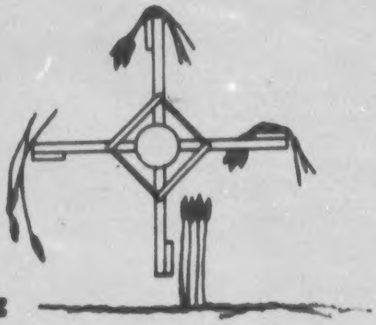
43. This illustration shows the correct procedure for

A. setting knife register
B. setting guards
C. adjusting knife sections
D. adjusting lead angle



44. If the grain tends to wrap around the bats as shown below, the reel needs to be

A. raised
B. lowered
C. speeded up
D. slowed down



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45. All other considerations being equal, which of the following belt drives on a grain auger will need to be the tightest?

A. A 2 foot drive with a smooth load
B. A 4 foot drive with a smooth load
C. A 2 foot drive with a pulsating load
D. A 4 foot drive with a pulsating load

46. Which of the following chains are likely to be used in the web of a manure spreader?

A. Roller chain
B. Pintle chain
C. Hook link or detachable link chain
D. Convex spur chain

47. The temperature of the hottest part of a neutral oxyacetylene flame is approximately

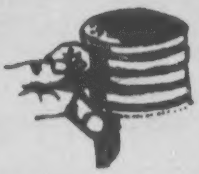
A. 1300° F
B. 1600° F
C. 2300° F
D. 6000° F

48. Broken mower guards probably should be

A. welded by acetylene fusion
B. bronze welded
C. arc welded with a hardfacing rod
D. replaced with new guards

49. What operation is this mechanic performing?

A. Reaming the ring groove
B. Scraping carbon from the ring groove
C. Checking for ring groove wear
D. Sizing the ring groove for new rings



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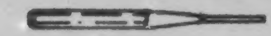
50. For general purpose cutting, the cutting edge of a cold chisel should be sharpened to an angle of

- A. 30°
- B. 40°
- C. 50°
- D. 60°

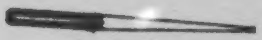
51. The tool illustrated below is a

- A. drift punch
- B. center punch
- C. pin punch
- D. none of the above



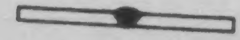
52. The tool shown below is a

- A. drift punch
- B. starting punch
- C. center punch
- D. none of the above



53. The weld joint shown below is

- A. flat butt
- B. vertical butt
- C. flat lap
- D. none of the above



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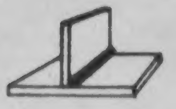
54. The weld joint shown below is

A. vertical butt
B. flat cap
C. fillet
D. none of the above



55. Which metal listed below becomes brittle and fractures easily if over heated?

A. Aluminum
B. High carbon steel
C. Mild steel
D. Brass

56. A narrow bead is most probably caused by

A. improper electrode angle
B. improperly prepared metal
C. improper speed of travel
D. improper length of arc

57. The minimum width load which requires special permission to travel on roads in Ohio is

A. 8 ft.
B. 10 ft.
C. 12 ft.
D. 14 ft.

58. The minimum width load which requires wide load signs is

A. 8 ft.
B. 10 ft.
C. 12 ft.
D. 14 ft.

59. In using a drill press, as the size of the twist drill increases, the speed of the drill in RPM's should

A. remain constant
B. increase
C. fluctuate
D. decrease

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60. Use of lead or pilot holes in drilling metal is desirable when

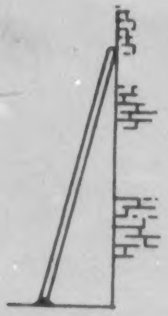
A. drilling unusually hard metal
B. drilling brass or metal
C. drilling holes larger than 1/2" in diameter
D. drilling holes smaller than 1/2" in diameter

61. The most desirable room temperature for spray painting metal is

A. 40-50 degrees F
B. 65-85 degrees F
C. 110-120 degrees F
D. below 40 degrees F

62. A straight ladder should be placed so that the distance of the foot of the ladder from the support is equal to

A. one-fourth of its height
B. one-third of its height
C. one-half of its height
D. none of these



63. To reduce spray drift hazards

A. use large nozzle tips operated at lower pressures
B. operate the sprayer at pressures over 50 PSI
C. spray only when the wind exceeds 10 mph
D. operate spray equipment at speeds in excess of 10 mph

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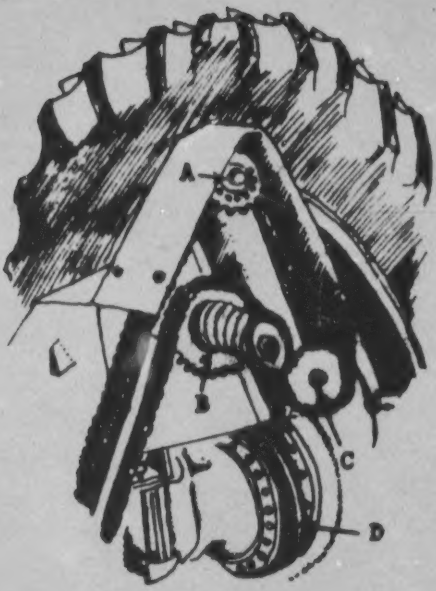
64. The safety clutch shown in the picture is labeled as item

A.
B.
C.
D.



65. When trouble shooting a tractor that won't start, it is determined that there is a fuel system problem. The first thing to check is

A. a clogged air filter
B. a defective fuel pump
C. is there gasoline in the tank
D. is the fuel line clogged

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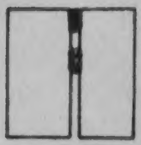
66. The subsoil of land you are considering draining is yellow and red. This coloration is a good indication that the subsoil is

A. well drained
B. not well drained
C. a Cecil sandy loam
D. none of the above

67. When welding steel, which of the following procedures will give the least distortion when beginning a weld?

A.



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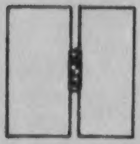

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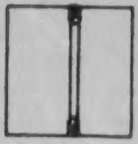

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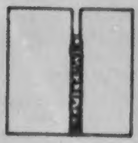

END OF TEST

FORM B-1

AGRICULTURAL MECHANICS MASTERY TEST

1. The type of fire extinguisher most appropriate for extinguishing an electrical fire is

   A. soda-acid
   B. foam
   C. carbon tetrachloride
   D. carbon dioxide

2. Small 2-cycle engines are preferred over 4-cycle engines where

   A. high engine speed is necessary
   B. where the most horsepower can be obtained with the least amount of weight
   C. it is a must to have an engine that starts very easy
   D. where fuel consumption is very critical per horsepower developed

3. If when checking the carburetor float needle, valve, and seat you observe a groove worn around the valve, what should you do?

   A. Ignore it
   B. Replace the seat
   C. Replace the valve
   D. Replace both valve and seat

4. In a 2-cycle engine the fuel air mixture which is passing into the cylinder during the intake stroke has just prior to this been contained in the

   A. piston
   B. crankcase
   C. gas tank
   D. carburetor

5. One of the problems associated with maintaining a small engine is that of providing it with clean air to be used in the combustion process. To help in providing the engine with clean air

   A. a sediment bowl is located in the air intake system
   B. an air vane type governor is used to regulate the clean air intake
   C. a breather assembly is installed in the crankcase
   D. an air cleaner is used

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6. When the gravity type fuel system on a small engine is not providing fuel into the cylinder and there is gasoline in the tank, the first step in locating the probable cause would be to find out if

   A. the intake valve is stuck in the closed position
   B. the main jet is adjusted correctly
   C. the fuel line is clear
   D. bowl is full of gasoline

7. When starting a newly overhauled engine prior to tuning what is (are) good jet setting (s) ?

   A. Open main jet valve one turn and idle jet valve open two turns.
   B. Open main jet valve 1/2 turn and idle jet valve open two turns.
   C. Open both one to one and one half turns.
   D. Refer to service manual

8. In a typical small engine ignition system current flows from the secondary winding of the coil through a wire to the

   A. spark plug
   B. breaker points
   C. condensor
   D. primary coil

9. Feeler gauges can be used in checking

   A. piston ring end gap
   B. piston cylinder clearance
   C. crankshaft end play
   D. all of the above

10. One of the more common ignition malfunctions on a 4-cycle small engine is caused

   A. by oil in the gasoline
   B. by a governor out of adjustment
   C. by oil on the breaker points
   D. by a "frozen" butterfly valve

11. In both the 2 and 4-cycle engines the air fuel mixture is ignited when the

   A. pistons are sectionally eliptical in cross section
   B. exhaust valves open so as not to wreck the engine
   C. pistons are near the top of the cylinder
   D. none of the above

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12. The oil ring on a small engine is

A. always the top ring on the piston
B. always the lowest ring on the piston
C. placed in any of the piston grooves
D. always placed in the middle groove

13. The crankcase of a 2-cycle engine is sealed or air tight so that

A. it is easier to cool the engine
B. the oil won't leak out
C. it keeps dirt and dust off the breaker points
D. it functions as part of the intake system

14. To check a small engine cylinder head for warpage a

A. micrometer and table are used
B. face plate and prussian blue are used
C. warpstick and dial indicator are used
D. none of the above are used

15. In checking a cylinder for wear we should check for

A. diameter and taper
B. out of round and taper
C. diameter, taper and out of round
D. diameter only

16. "Go, no-go" gauges are commonly used in taking small engine measurements. Why are they used?

A. They are expensive to buy
B. They are a fast method of determining if the part has exceeded tolerance
C. If you drop them they will not go out of adjustment like a micrometer
D. They are more precise a form of measurement than a micrometer

17. A small hole gauge and micrometer are used to check the

A. connecting rods for wear
B. pistons for wear
C. flywheels for wear
D. valve guides for wear

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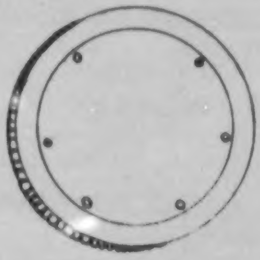
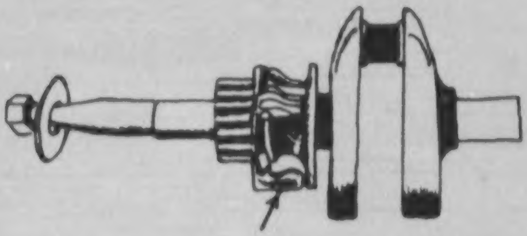
18. The purpose of the part shown in this picture is to

    A. maintain the momentum of the engine
    B. reduce ring "clatter"
    C. transmit power from the engine to the transmission
    D. increase the rate of acceleration of the engine



19. The mechanism on the crankshaft to the left of the crank throw is a

    A. vibration damper
    B. governor device
    C. cam lobe
    D. slip clutch



20. Oil coolers on tractors are designed very similar to

    A. air conditioning compressors
    B. LPG coolers
    C. freon coolers
    D. water radiators

GO TO NEXT PAGE

21. If your tractor engine is consuming oil excessively, which of the following would you check as a possible cause?

A. Worn rings
B. Worn oil pump
C. Burnt valves
D. Clogged oil screen

22. Using the following chart, how many quarts of antifreeze are required for a tractor with a cooling system capacity of 18 quarts if the desired protection temperature is -10°?

A. 5 quarts
B. 6 quarts
C. 7 quarts
D. 8 quarts

FREEZING PROTECTION TABLE

Cooling system Capacity in Quarts	"Permanent" Antifreeze Required								
	1	2	3	4	5	6	7	8	9
5	16°	-12°	-62°						
6	19°	0°	-34°						
7	22°	7°	-17°	-54°					
8	23°	11°	- 7°	-34°	-69°				
9	24°	14°	0°	-21°	-50°				
10	25°	16°	4°	-12°	-34°	-62°			
11	26°	18°	8°	- 6°	-23°	-47°			
12		19°	10°	0°	-15°	-34°	-57°		
13		21°	13°	3°	- 9°	-25°	-45°	-66°	
14			15°	6°	- 5°	-18°	-34°	-54°	
15			16°	8°	0°	-12°	-26°	-43°	-62°
16			17°	10°	2°	- 8°	-19°	-34°	-52°
17			18°	12°	5°	- 4°	-14°	-27°	-42°
18			19°	14°	7°	0°	-10°	-21°	-34°
19			20°	15°	9°	2°	- 7°	-16°	-28°
20				16°	10°	4°	- 3°	-12°	-22°
21				17°	12°	6°	0°	- 9°	-17°
22				18°	13°	8°	2°	- 6°	-14°

23. Using this same chart, how many quarts of antifreeze are required for a tractor with a cooling system capacity of 21 quarts if the desired protection temperature is 10°?

A. 4 quarts
B. 6 quarts
C. 7 quarts
D. 8 quarts

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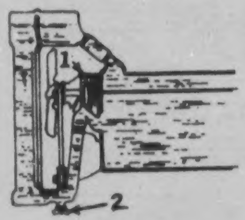
24. From this diagram of the cooling system, number 1 is

A. pressure radiator cap
B. non-pressure radiator cap
C. water pump
D. none of the above

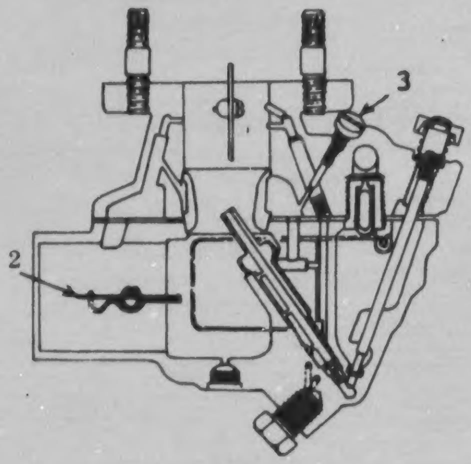


25. If a test showed carbon monoxide in the water in the radiator of a tractor after the engine had been running for more than ten minutes, what would be the most probable cause?

A. Damaged head gasket
B. Exhaust manifold gasket leaking
C. Worn or broken valves
D. Worn out water pump

26. From this diagram of the cross section of a carburetor, number 2 is

A. the choke plate
B. the main mixing chamber
C. the float bowl
D. the venturi



27. If a tractor is giving off black smoke from the exhaust pipe when under a heavy load, the fuel mixture is

A. too lean
B. too rich
C. just right
D. can't tell from this information

GO TO NEXT PAGE

28. When starting a tractor on a cold morning, the engine is choked to

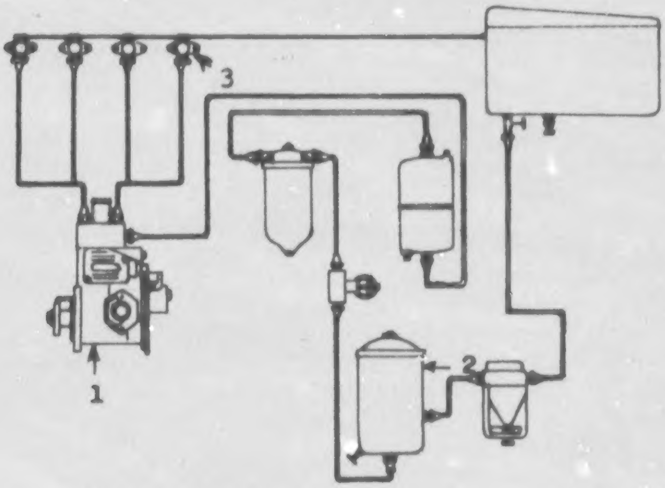
A. reduce the amount of gas
B. warm the incoming air
C. lean the fuel mixture
D. richen the fuel mixture

29. LP-gas tanks on tractors should be filled to what percent of their capacity?

A. 60%
B. 80%
C. 90%
D. 100%

30. From this diesel fuel system diagram, the part labeled number 2 is the

A. first stage filter
B. second stage filter
C. final stage filter
D. none of the above



31. From this same diagram, the function of number 1 is to

A. meter fuel
B. develop high fuel pressure
C. distribute fuel
D. all of the above

GO TO NEXT PAGE

32. The engine runs but misses. Which of the following would you check out first as a probable cause of this malfunction?

    A. Distributor cap defective
    B. Undersized battery cables
    C. Worn piston pin or bushing
    D. Low water level in battery

33. Fuel storage tanks that are to be exposed to sunlight should be painted

    A. green
    B. black
    C. white
    D. red

34. When you turn the switch on and try to start the engine, nothing happens (doesn't turn over). Which of the following would you check out first as a possible cause of this malfunction?

    A. Bad distributor
    B. Points not adjusted properly
    C. Corroded terminals on battery
    D. None of the above

35. The tractor engine runs but you are getting no power through the transmission at all. Which of the following is most likely the cause of the malfunction?

    A. Gears worn
    B. Excessive main shaft end play
    C. Gear teeth stripped
    D. Idler gear broken

END OF TEST

FORM B-2

AGRICULTURAL MECHANICS MASTERY TEST

1. The transmission is noisy while operating in gear. Which of the following would probably cause the noise?

   A. Clutch not releasing
   B. Bearings worn or dry
   C. Gears tight on shaft splines
   D. All of the above

2. The tractor clutch is slipping. Which of the following would you check out as a possible cause?

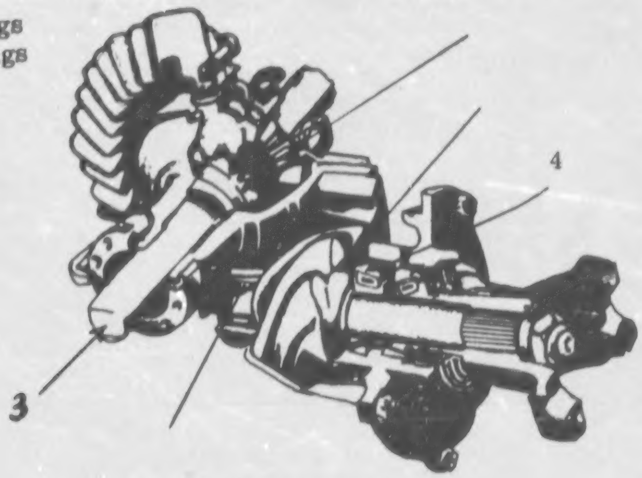
   A. Bent crankshaft flange
   B. Improperly adjusted clutch linkage
   C. Pilot bearing or bushing loose
   D. All the above

3. The tractor engine clutch is pulsating as felt on the clutch pedal. Which of the following would you check as a possible cause?

   A. Bent crankshaft flange
   B. Weak clutch pressure springs
   C. Foreign material on clutch facing
   D. None of the above

4. From this drawing of a differential assembly, number 4 represents the

   A. tapered roller bearings
   B. straight roller bearings
   C. ball bearings
   D. none of the above



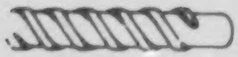
5. Which of the following best describes an independent PTO?

   A. Can operate when clutch is engaged
   B. Can be disengaged any time while engine keeps running
   C. Must be manually engaged
   D. All of the above

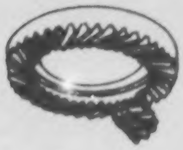
GO TO NEXT PAGE

6. Which of the following gear arrangements is used in modern tractor differentials?

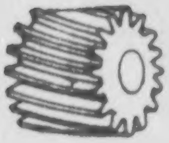
A.



B.



C.



D. None of the above

7. Brake drag is normally caused by all of the following reasons except which one?

A. Brake shoes rubbing on brake drums
B. Air in the hydraulic system
C. Sticking wheel cylinder pistons
D. Weak brake-shoe return springs

8. When adjusting front end alignment on a tractor, the two front wheels should be angled in at the front. This is called

A. lead-in
B. tracking
C. toe-in
D. none of the above

9. The oil in the hydraulic system shows excessive heating. Which of the following is not a probable cause of the malfunction?

A. Restricted lines
B. Viscosity of oil too high
C. Pump volume too high
D. Internal oil leakage due to wear

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10. Upon inspecting the hydraulic system on a tractor, it is found that the pump is failing to deliver oil. Which of the following is not a probable cause of the malfunction?

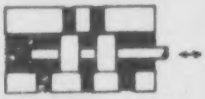
A. Oil intake line or filter plugged
B. Relief valve setting too high
C. Low oil level in reservoir
D. Air leakage in line

11. While operating a backhoe, you see foam coming from the filter on the hydraulic system. This is probably caused by

A. wrong type of oil
B. the pump being operated too fast
C. bad seals on the hydraulic rams
D. all of the above

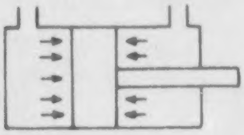
12. This drawing best illustrates

A. a spool valve
B. a cock valve
C. a rotary valve
D. an air vent valve

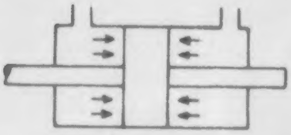


13. Which of the following illustrates the type of cylinder that is best to use on a bulldozer to lift and lower the scraper blade?

A.



B.



C. Neither
D. Both

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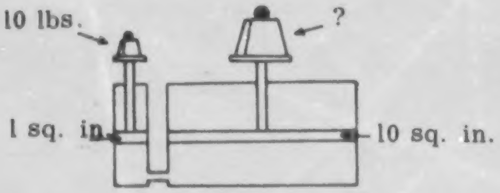
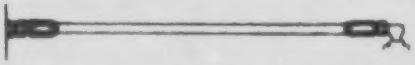
14. Using the drawing shown below, how much force is exerted on lifting the large weight by pushing down with ten pounds of force on the smaller weight?

A. 10 pounds
B. 20 pounds
C. 100 pounds
D. 1000 pounds

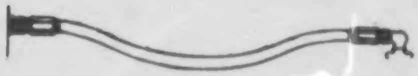


15. Which one of the following hose installations is correct for hydraulic systems?

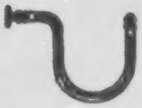
A.



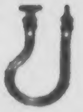
B.



C.

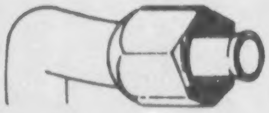


D.



16. This illustration is of a common type of line connection used in tractor air-conditioning systems. It is

A. an aircraft fitting
B. a hose clamp fitting
C. an o-ring fitting
D. a flare fitting



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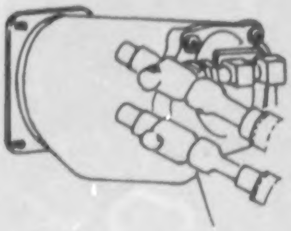
17. This unit is part of the air-conditioning system on a tractor. It is

A. a compressor
B. an evaporator
C. a receiver-dryer
D. a vacuum pump



18. This same unit pictured above is used to

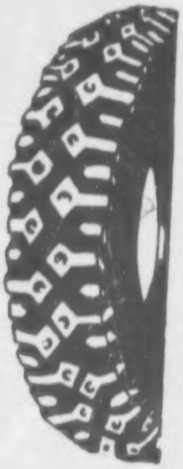
A. develop needed pressure
B. cool the coolant in the system
C. create a vacuum to dissipate heat
D. convert liquid to gas

19. When adding refrigerant to an air-conditioning system, it must enter as a

A. vapor
B. liquid
C. solid
D. either a solid or a liquid

20. The tire illustrated here is used primarily on

A. mud
B. pavement
C. sand
D. tall grass



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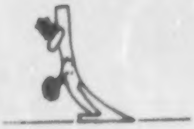
21. When tightening the spindle nut on a front wheel bearing after packing the bearings with new grease, it should be tightened by

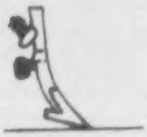
- A. applying approximately 25 lbs. torque
- B. bringing up tight and adding 1/2 turn
- C. bringing up tight and backing off 1/2 turn
- D. bringing up tight and backing off one turn

22. You are setting up a cultivator for a customer to use in cultivating corn. Which of the following shovel settings will do the best job?

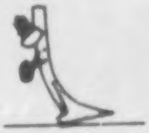
A.



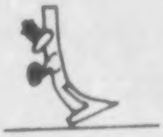
B.



C.



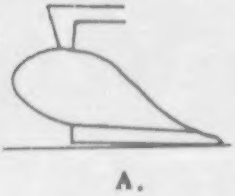
D.



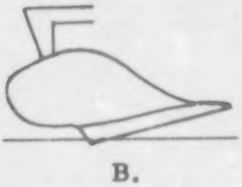
23. When adjusting a moldboard plow in the field, you should operate the plow in a previously established furrow. You should check and adjust which of the following items

- A. cross levelness of the plow. Note the respective height of the turned furrows
- B. measure the width of cut taken by the first bottom
- C. measure the depth of the last furrow and compare with desired depth
- D. all of the above

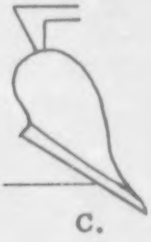
24. Which of the illustrations below represents the proper hitching position



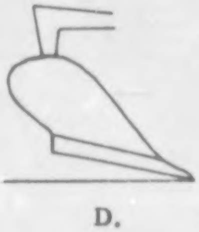
A.



B.



C.



D.

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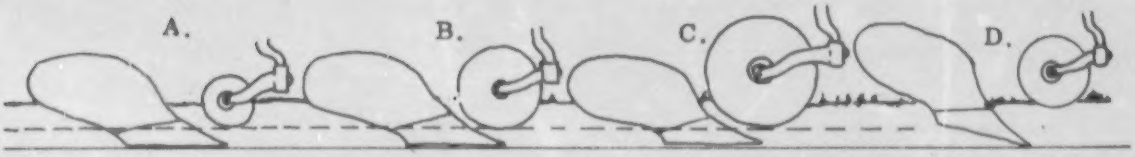
25. Select the coulter below that would be most appropriate for use in a field with a lot of trash.



26. What is the recommended method of changing a corn planter in the field to increase the rate of seeding?

- A. Decrease the speed of the seed plate
- B. Use a seed plate with more seed cells
- C. Select a seed plate with larger seed cells
- D. Increase the speed of the seed plate

27. You have a flex planter set up for planting corn with a cell plate having 28 holes. This planter has a 16" diameter press wheel with a 3 to 1 ratio to the cell plate. The tractor will be traveling at the rate of 3 miles per hour. What will be the spacing of the kernels of corn of the rows?

- A. 5"
- B. 6"
- C. 7"
- D. 10"

28. If you plan to harvest corn with a four row harvester, you would plant the corn with a

- A. 2 row planter
- B. 6 row planter
- C. 8 row planter
- D. 10 row planter

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29. Which of the following factors does not affect the eventual spray application rate per acre?

    A. Pressure and delivery of the pump
    B. Volume of the tank
    C. Speed of forward travel
    D. Nozzle size

30. Select the best in-field adjustment to reduce spray volume.

    A. increasing operation pressure
    B. lowering operation pressure
    C. changing pumps
    D. shortening the spray boom

31. If you are spraying a wettable powder and the sprayer clogs, the first place you would inspect for clogging would be the

    A. strainer
    B. jet agitator
    C. nozzle
    D. pressure regulator

32. How often should the tension of all chains and belts on a new corn picker be checked when first breaking it in?

    A. Every 2 or 3 weeks
    B. Every few hours
    C. Every 100 hours
    D. Weekly

33. On corn pickers, the snapping rolls are adjusted by

    A. eye bolts
    B. screw
    C. lever
    D. chain tension

34. When picking corn on rough or rocky land and the corn is standing well, it is recommended that you use a

    A. lower position for the head
    B. higher position for the head
    C. tighter chain tension
    D. narrower spacing for snapping rollers

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35. Greatest loss when harvesting corn with a corn combine usually occurs in the form of

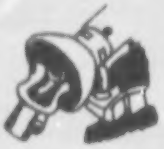
A. cylinder loss
B. rack and shoe loss
C. header loss
D. snapping roll loss

36. Which of the following is the cause of excessive cracked grain while combining?

A. Cylinder speed too high
B. Threshed grain returned in tailings
C. Insufficient concaves and cylinder clearance
D. All the above

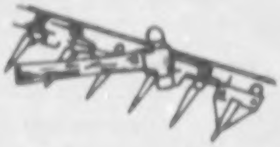
37. The part shown in this picture is

A. a ball joint
B. a multiple flex joint
C. a universal joint
D. a slip shaft coupling joint

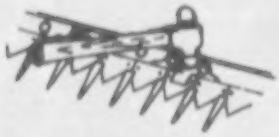


38. Which of the following illustrations show correct procedure for setting knife clip down

A.



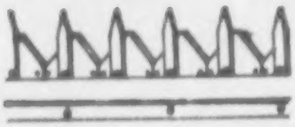
B.



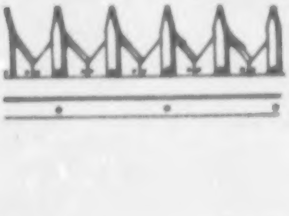
C. neither
D. both

39. Which illustration below shows the proper sickle register at the end of the stroke

A.



B.



C. neither

D. cannot tell from illustrations

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40. The driver pulley on your elevator is 4 inches in diameter and runs at 200 RPM. The driven pulley is 8 inches in diameter and runs at

A. 100 RPM
B. 200 RPM
C. 400 RPM
D. 1600 RPM

41. The driver pulley on your auger is 4 inches in diameter and runs at 250 RPM. The driven pulley on the auger must run at 100 RPM. What size driven pulley is needed?

A. 4 inches
B. 7 1/2 inches
C. 10 inches
D. 12 1/2 inches

42. When the bronze rod is applied in bronze welding gray cast iron, the gray cast iron should be heated to

A. a light blue color
B. 200 degrees cooler than the molten bronze
C. the same temperature as the molten bronze
D. a bright yellow color

43. As cylinder speed increases, cylinder loss

A. increases
B. decreases
C. cylinder speed has no effect
D. all the above

44. An incorrect cylinder concave clearance

A. reduces cylinder loss
B. increases cylinder loss
C. does not affect cylinder losses
D. none of the above

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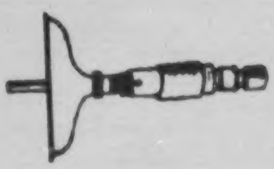
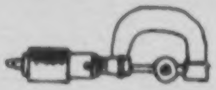
45. The tool shown in this illustration is

A. a vertical micrometer
B. a depth micrometer
C. a tolerance micrometer
D. none of the above



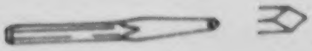
46. The tool shown in this illustration is

A. a depth micrometer
B. an outside micrometer
C. a vertical micrometer
D. none of the above



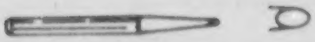
47. The tool shown below is

A. a round nose chisel
B. a center chisel
C. a diamond point chisel
D. none of the above



48. The tool shown below is

A. a round nose chisel
B. a center chisel
C. a bevel nose chisel
D. none of the above



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49. For drilling hard tough steel, a 1/2 inch twist drill should be sharpened to a point angle of

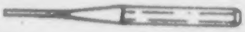
A. 12°
B. 15°
C. 59°
D. 70°

50. The punch used to mark the location of a hole that is to be drilled to eliminate drill "wandering" is

A. an aligning punch
B. a drift punch
C. a center punch
D. a pin punch

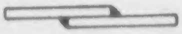
51. The tool illustrated below is

A. a line punch
B. a center punch
C. a pin punch
D. none of the above



52. The weld joint shown below is

A. a vertical butt
B. a flat butt
C. a flat fillet
D. none of the above



53. Large amounts of small drops of spatter along arc welding bead results from

A. incorrect angle of electrode
B. travel too slow
C. current setting too high
D. arc too long

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54. A flat bead results from

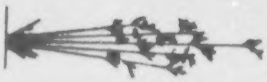
A. arc too short
B. incorrect angle of electrode
C. travel too slow
D. current setting too high

55. A spattered weld is most probably caused by

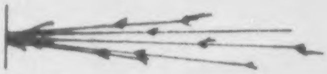
A. improper arc length
B. high current setting
C. improper electrode angle
D. improper speed of travel

56. Which of the sparks shown are produced by grinding cast iron?

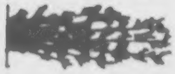
A.



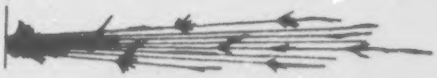
C.



B.



D.



57. For unloading an assembled 3 bottom plow from a truck, you should use a

A. fork lift
B. lift boom
C. wrecker
D. crane

GO TO NEXT PAGE

58. A load that extends 8 feet over the rear of the truck should be marked with

A. red flags
B. yellow flags
C. at least 2 lights
D. all the above

59. Hand hack saw blades cut on the

A. forward stroke
B. return stroke
C. forward and return stroke
D. none of the above

60. Which of the following would not likely cause an "orange peel" finish when spray painting equipment?

A. Improper thinner
B. Holding spray gun too far or too close to the object being painted
C. Too low an atomization pressure
D. Paint mixed too much

61. Farmer Brooks is planning to repaint a burned spot on the hood of his tractor. The generally accepted procedures for doing touch-up work on metal are identified below. Which of the following tasks should be done first?

A. Wash the surface. Remove all wax and oil.
B. Build up sanded area with primer-surfacer.
C. Sand until level and perfectly smooth.
D. Apply a coat of thinner to smooth out rough spots.

62. Soda-acid and foam extinguishers must be completely cleaned and recharged

A. once a year
B. every 3 years
C. every 5 years
D. never

63. A tractor can be overturned backwards by

A. setting the drawbar too high
B. setting the drawbar too low
C. lengthening the drawbar
D. sudden application of brakes

END OF TEST

FORM C-1

AGRICULTURAL MECHANICS MASTERY TEST

1. If someone enters your shop to visit while you are working, you should

   A. ask them to leave
   B. ask them to make themselves at home, then check to see if your insurance is paid
   C. warn them of possible dangers
   D. provide them with safety goggles or glasses as you warn them of any hazards

2. In preparing a 2-cycle engine for winter operation the crankcase oil should be changed to

   A. SAE 10 W 30
   B. SAE 10-50
   C. SAE 10
   D. none of the above

3. In a suction type carburetor the fuel tube can be checked for restrictions (blockage) by

   A. blowing air through it from the screen end
   B. blowing air through it from the end opposite the screen
   C. blowing air through it either way
   D. hold it up to a light and visually check the tube for restrictions

4. A cold gasoline engine generally requires choking. Choking is necessary

   A. because cold gasoline is not easy to vaporize
   B. to increase venturi velocity so as to draw more fuel from the carburetor
   C. to allow for the "air bleed" in the main jet system
   D. to keep raw gas from entering the manifold

5. The throttle butterfly is located

   A. in the crankcase
   B. in the fuel tank
   C. between the ventri and intake manifold
   D. in the carburetor bowl so as to control the fuel level

GO TO NEXT PAGE

6. In a suction-type fuel system, the carburetor bowl and fuel tank are one and the same. In order for it to serve these two functions

A. the tank is built shallow
B. the tank is placed above the carburetor
C. a float is placed in the tank
D. the fuel pipe is no longer needed

7. In tuning an engine the final adjustment of the carburetor is made

A. before starting the engine
B. as soon as the engine is started
C. after the engine is warmed up
D. only while it is running at idling speed

8. In order to get the strongest possible spark from the magneto on an aluminum flywheel, the air gap

A. is adjusted as wide as possible
B. is set so that it rubs the flywheel slightly
C. is set by using a postcard as a thickness guage
D. is set as close as possible without parts rubbing

9. In trouble shooting a small engine when the ignition system is suspected of causing the problem, the first logical step would be to

A. remove the flywheel and check the condenser
B. remove the flywheel and check the points for pits and adjustment
C. check to see if there is spark at the spark plug terminal
D. remove the spark plug and see if it is serviceable

10. Spark is provided to the spark plug when the breaker points are

A. open and the lines of force in the magneto cut the primary coil
B. open and the lines of force in the magneto cut the secondary coil
C. closed and the lines of force in the magneto cut the primary coil
D. closed and the lines of force in the magneto cut the secondary coil

11. In 4-cycle small engines the most probable source of low compression is

A. bad valve (s)
B. carburetor out of adjustment
C. bad spark plug
D. partially blocked exhaust ports

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12. 2-cycle engines may be hard to start if

    A. the reed valves do not seat
    B. oil is not mixed with the fuel
    C. the crankcase leaks air
    D. all of the above

13. The cylinder bores in a worn engine block generally show the most wear

    A. outside the area of piston travel
    B. near the top of the area of piston travel
    C. near the bottom of the area of piston travel
    D. on the "ridge"

14. A newly honed cylinder should have

    A. a very smooth surface
    B. a coarse surface
    C. a surface with a cross-hatched honing pattern
    D. a surface with a horizontal honing pattern

15. In torquing cylinder head bolts

    A. all small engine heads are torqued to the same specifications
    B. cast iron heads are torqued to a lesser inch/lbs. than aluminum heads
    C. aluminum heads are torqued with a special torque wrench
    D. torquing should be done to manufacturer's specifications

16. In checking a valve-stem diameter with a micrometer it must be checked in at least

    A. 5 places
    B. 3 places
    C. 4 places
    D. 6 places

17. The margin on a small engine valve is generally specified to be between 1/32 and 1/64 inch. This margin is necessary in order to

    A. seat the valves properly
    B. prevent them from opening too soon
    C. keep from warping the valve stems
    D. to prevent burning and warping of the valve head

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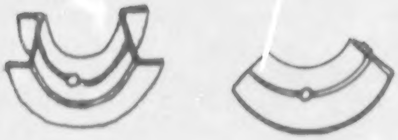
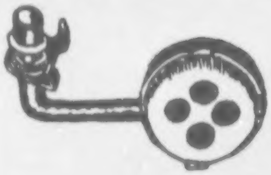
18. Pictured below are

A. axle brackets
B. limited slip shims
C. engine bearings
D. engine half-sleeves



19. The engine part shown below is a part of the

A. fuel system
B. lubrication system
C. exhaust system
D. electrical system



20. Which is the thinnest of these oil viscosity ratings?

A. SAE 5W
B. SAE 30W
C. SAE 10-30W
D. SAE 20-20W

21. The main reason for keeping air cooled engines as clean as possible from accumulations of dirt and other matter is

A. to assist in the dissipation of engine heat
B. to reduce friction
C: to reduce the chance of getting dirt in the gasoline tank
D. to keep from overloading the engine

22. Tractor water jackets are located in the

A. thermostat
B. engine block
C. radiator
D. oil pan

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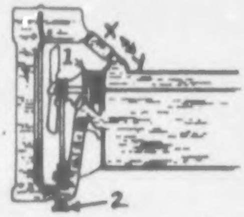
23. From this diagram of the cooling system, number 2 is

A. coolant sealing plug
B. freeze plug
C. water cap
D. drain plug



24. Using the above illustration, which way does the water flow in a normal cooling system in a tractor?

A. From x toward y
B. From y toward x
C. Could flow either way
D. Could flow both ways

25. Which of the following would not cause a tractor engine to overheat?

A. Overflow tube broken off
B. Loose fan belt
C. Insufficient oil
D. Overloading of the engine

26. Suppose when checking the fuel system on a gasoline tractor you remove the air cleaner and find that the high-speed nozzle is discharging gasoline while the engine is idling. What is the probable cause?

A. The idle speed set too high
B. The high-speed needle valve is open too far
C. The high-speed needle valve is closed too far
D. The float level is too high

27. If there is water in the gasoline tank of a tractor, the water

A. will be floating on top of the gasoline
B. will be mixed together with the gasoline throughout the tank
C. will be in the bottom of the tank
D. cannot be found in the gasoline tank

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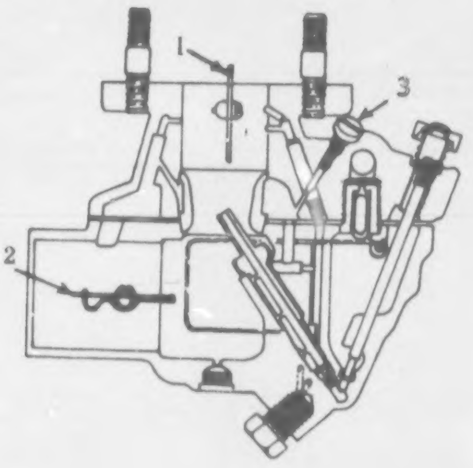
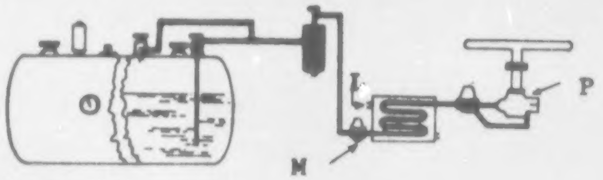
28. From this diagram of the cross section of a carburetor, number 1 is

A. the divider plate
B. the float plate
C. the throttle plate
D. the choke plate



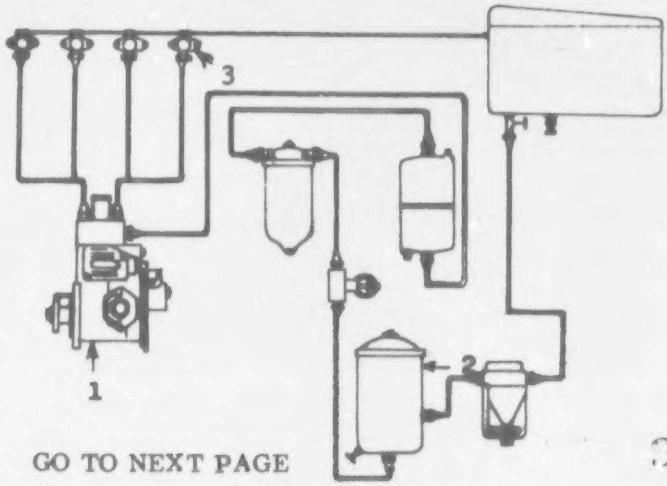
29. From this drawing of an LPG fuel system, letter M is the

A. high-pressure regulator
B. low-pressure regulator
C. one-way safety valve
D. vapor-line valve



30. From this diesel fuel system diagram, the part labeled number 3 is the

A. distributor
B. injection pump
C. injector
D. fuel valve



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31. The tractor engine turns over slowly but will not start. Which of the following would you check out first as a possible cause of this malfunction?

A. Generator not functioning
B. Defective fuel system
C. Run-down battery
D. All of the above

32. Which is the more volatile diesel fuel?

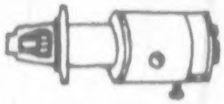
A. Fuel with a cetane number of 40
B. Fuel with a cetane number of 60
C. Fuel with an octane rating of 98
D. Not enough information available

33. The tractor engine overheats. Which of the following would you check out first as a possible cause of this malfunction?

A. Ignition timing late
B. Spark plugs are bad
C. Generator burned out
D. Defective coil

34. The engine part shown is

A. a generator
B. an alternator
C. a starter
D. an air-conditioning compressor



35. The transmission is slipping out of gear. Which of the following is the probable cause?

A. Gear teeth worn
B. Excessive main-shaft end play
C. Universal joint worn out
D. None of the above

END OF TEST

FORM C-2

AGRICULTURAL MECHANICS MASTERY TEST

1. When shifting the gears clash. Which of the following is the probable cause of the clashing?

A. Speedometer gears worn
B. Foaming due to improper lubricant
C. Clutch not releasing properly
D. Universal joint dragging

2. The engine clutch is making a noise while the tractor is being operated. Which of the following is the probable cause of the noise?

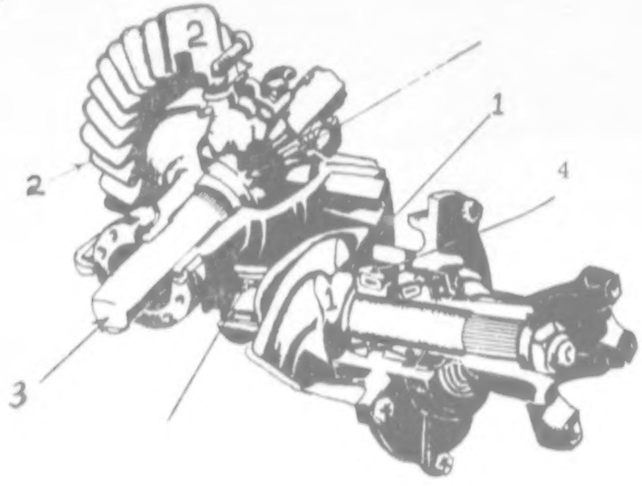
A. Weak clutch pressure springs
B. Oil on the clutch disk
C. Broken clutch pressure springs
D. None of the above

3. The clutch is grabbing and/or chattering when released. Which of the following is the probable cause of this malfunction?

A. Foreign material on clutch disk
B. Weak clutch springs
C. Misaligned linkage parts
D. None of the above

4. In this drawing of a differential assembly, the gear labeled 1 has 10 teeth and the gear labeled 2 has 41 teeth. What is the gear ratio?

A. 4.00 to 1
B. 4.10 to 1
C. .410 to 1
D. None of the above



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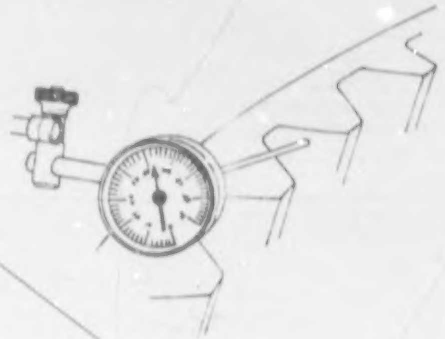
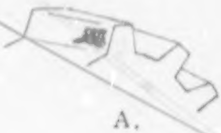
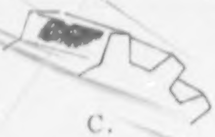
5. This tool pictured must be accurate to within

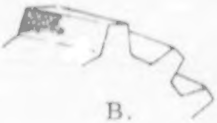
A. 1 inch
B. 1/10 inch
C. 1/100 inch
D. 1/1000 inch

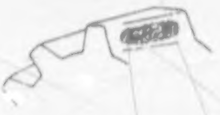


6. When adjusting ring and pinion gear sets in differentials and final drives, the gear contact must be set for proper wear. From the following drawings select the gear pattern best suited for tractor differentials.


A.

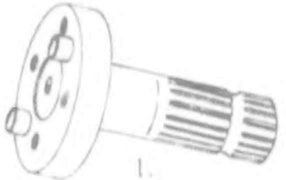

C.

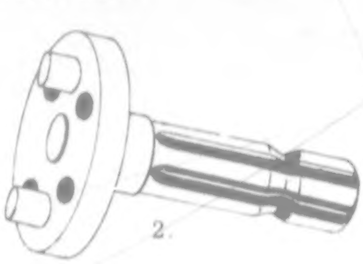

B.


D.

7. Using the drawings provided below, which one of the following statements is correct?

A. Number 1 is designed for 1000 RPM
B. Number 2 is designed for 1000 RPM
C. Both 1 and 2 are designed for 1000 RPM
D. Neither 1 or 2 are designed for 1000 RPM


1.


2.

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8. Which of the following is not a reason for a tractor pulling to one side when applying both brakes (right and left)?

A. Brake linings soaked with oil
B. Brake pedals or shoes unevenly adjusted
C. Tires not evenly inflated
D. Air in the hydraulic system

9. If your tractor doesn't drive straight down the road at high speed, the probable cause is

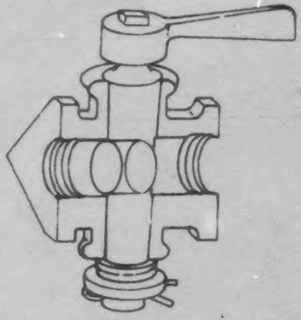
A. worn steering gears
B. worn front wheel bearings
C. worn tie rod ends
D. all of the above

10. A hydraulic accumulator is normally put in complex hydraulic systems to

A. build pressure fast
B. collect excess oil
C. absorb shock
D. collect dirt and other foreign material in the system

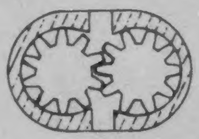
11. This drawing illustrates a

A. spool valve
B. cock valve
C. rotary valve
D. check valve



12. This drawing illustrates a

A. an external gear pump
B. an internal gear pump
C. a vane pump
D. a rotor pump



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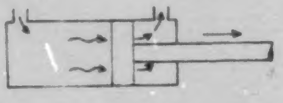
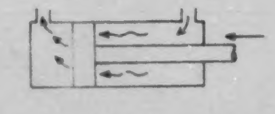
13. In which direction does this hydraulic ram shown in this drawing develop its greatest force?

A. Extending
B Retracting
C. Both
D. Stopped in the middle

A.



B.

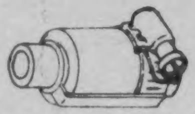


14. When trouble shooting a hydraulic system, you find the oil to be very milky. This condition is probably due to

A. too heavy of a grade of oil
B. an air leak somewhere in the system
C. water leaking into the system
D. all of the above

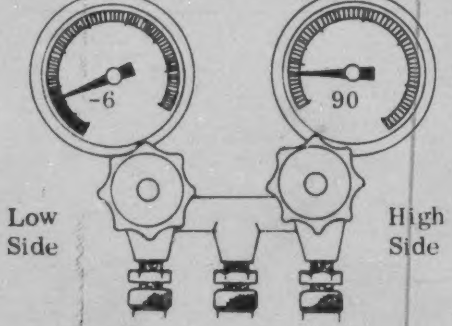
15. This illustration is of a common type of line connection used in tractor air-conditioning systems. It is

A. an aircraft fitting
B. a hose clamp fitting
C. an O-ring fitting
D. a flare fitting



16. The customer complained of very little or no cooling in the cab of his tractor. While trouble-shooting the system, the following guage situation was observed. The probable cause of the customer's complaint is

A. air in the system
B. a malfunctioning condenser
C. lack of refrigerant charge
D. cannot be determined



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17. The halide leak detector is used to tell you about the presence or absence of refrigerant in an air-conditioning system. It reacts by a change in color of a propane flame. If that flame is yellow

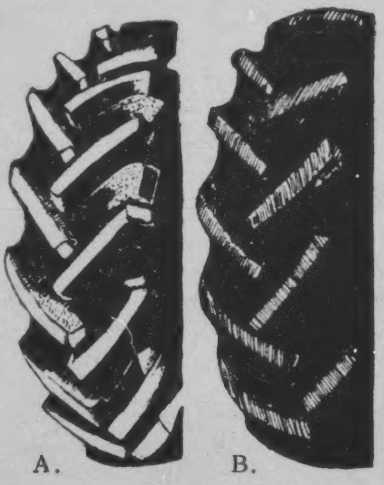
    A. a small amount of refrigerant is present
    B. a large amount of refrigerant is present
    C. no refrigerant is present
    D. the detector is not adjusted correctly

18. The halide leak detector is used to tell you about the presence or absence of refrigerant in an air-conditioning system. It reacts by a change in color of a propane flame. If that flame is purplish-blue

    A. a small amount of refrigerant is present
    B. a large amount of refrigerant is present
    C. no refrigerant is present
    D. the detector is not adjusted correctly

19. Tread A has a much higher cleat than does B. The main purpose of this deeper cleat is

    A. longer tire wear
    B. more floation
    C. more traction
    D. for working in orchards



20. After the spindle nut is properly tightened, normally you would then

    A. replace the dust cover
    B. replace the inner seal assembly
    C. install a cotter pin
    D. replace the tire and wheel

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21. If you wanted to buy new tires for your tractor, using this chart, which size would you select for a 24 inch rim and 2000 pound load at 20 lbs of air pressure?

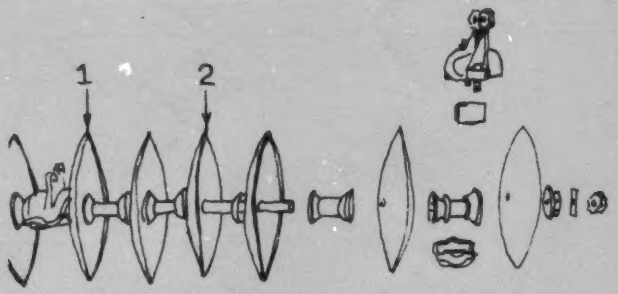
A. 9.5/9-24
B. 11.2/10-24
C. 12.4/11-24
D. 13.6/12-24

Tire Loads at Various Inflation Pressures

Tire Size	16	18	20
8.3/8-24	1140	1220	1300
9.5/9-16	1075	1150	1225
7.50-22	1310	1405	1500
9.5/9-24	1435	1535	1640
9.5/9-32	1630	1740	....
9.5/9-36	1725	1850	....
11.2/10-24	1735	1860	1980
11.2/10-28	1860	1990	2120
11.2/10-34	2035	....	....
11.2/10-36	2100	2250	2400
11.2/10-38	2155	2305	2460
11.00 - 16	1835	1965	2095
12.4/11-24	2090	2240	2390
12.4/11-28	2230	2385	2550

22. You are responsible for reconditioning this harrow section shown below. The parts labeled 1 and 2 below are worn and need to be replaced. They are called

A. discs
B. bearing spools
C. plain spools
D. gang bearing housings



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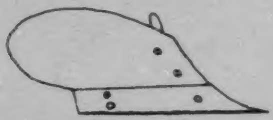
23. When setting up and adjusting a new moldboard plow, the mechanic should adjust the pitch of the plow so the heel clearance is

A. 0"
B. 1/2"
C. 1"
D. 2"

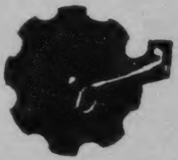
24. This plow design is correctly called

A. a slatted general purpose bottom
B. a high speed general purpose bottom
C. a general purpose bottom
D. an extra duty bottom



25. The coulter blade is generally called

A. a notched blade
B. a plain blade
C. a fluted blade
D. none of the above



26. Which of the following drill furrow openers is best for trashy conditions?

A. Shoe-type
B. Hoe-type
C. Single disk
D. Lister

27. If you want 21,000 plants of corn per acre and you have seed with 85% germination, how many seeds must you plant per acre?

A. 21,000 seeds
B. 24,150 seeds
C. 24,700 seeds
D. 28,225 seeds

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28. As corn planter speeds are increased difficulty may be expected because

A. heavy rates of fertilizer will be applied
B. too many kernels may be a problem
C. cracking of kernels may be a problem
D. seed will be covered too deeply

29. You are spraying a herbicide on a pasture with a 12 foot boom having 8 nozzles. The desired application rate is 40 gallon per acre. The tractor is moving at 5 miles per hour. You are using a nozzle size of .048" with a nozzle pressure of 40 lbs. P. S. I. Which of the following factors are needed to check the actual application rate?

A. Boom width, nozzle number and ground speed
B. Boom width, nozzle number and nozzle size
C. Boom width, nozzle number and nozzle pressure
D. Boom width, nozzle number, nozzle pressure, and nozzle size

30. Which of the following types of pumps is an example of a non-positive displacement pump?

A. Piston pump
B. Gear pump
C. Roller pump
D. None of the above

31. Your spray rig is delivering spray at the rate of 10 gallons per acre. To increase this to 20 gallons per acre you must

A. increase the pressure 2 times
B. decrease the pressure 2 times
C. increase the pressure 4 times
D. decrease the pressure 4 times

32. Which of the following situations might result from gathering chains on a corn picker being too loose or too tight?

A. Early ear "snapping"
B. Excessive wear on parts
C. Excessive stalk breakage
D. Increased operating speed required

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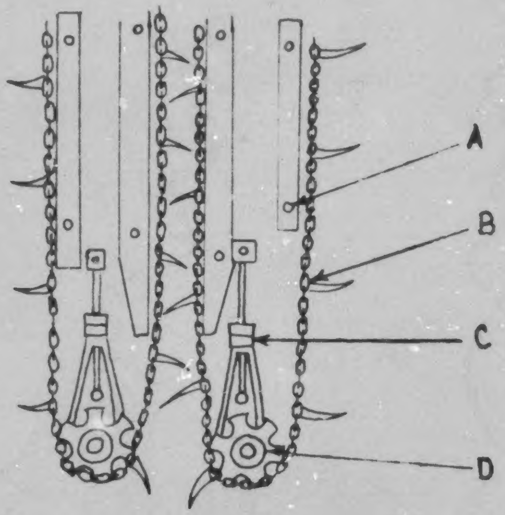
33. In the illustration of a corn picker, the correct point to adjust chains tension is



34. Excessive shelled corn losses on the ground when picking corn may be caused by

A. snapping rolls too wide apart
B. husking roll speed too high
C. husking rocl to aggressive
D. not enough snapping roll clearance

35. The adjustment of the corn picker's snapping rolls has a direct effect on the

A. total yield of the field
B. increased machine draft
C. rolling friction of the picker
D. shelling losses

36. You find a large amount of shelled corn on the ground behind a corn picker. Which of the following adjustments would help correct this condition?

A. Increase rate of forward travel
B. Move snapping rolls closer together
C. Decrease the tension on the husking rolls
D. Add lugs to the snapping rolls

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37. The greatest loss when harvesting soybeans usually occurs at the

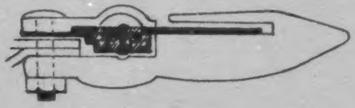
A. cylinder
B. straw rack
C. gathering unit
D. cleaning shoe

38. On a corn picker, generally a lower cleaning fan speed is required for corn of which moisture content?

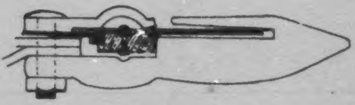
A. 14%
B. 20%
C. 25%
D. 30%

39. Knife adjustment is important for proper cutting. Which of the following illustrates proper adjustment

A.



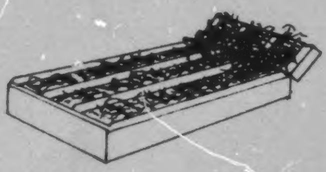
B.



C. neither of the above
D. cannot tell from these illustrations

40. If the chaffer extension is too high, as shown, it

A. allows light grain to be blown over
B. causes material to accumulate on chaffer causing choking
C. increase efficiency
D. all the above



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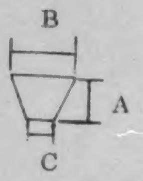
41. The width of a V-belt is the width of



42. Which one of the following jobs should not be bronze welded?

A. Spoke of a cast iron wheel
B. Drop forged box end wrench
C. Face of an exhaust valve for a tractor
D. Generator bracket

43. An oxyacetylene torch would be preferred to an arc welder when

A. all work is done in the shop
B. cutting cast iron
C. welding mild steel plow leveling lever
D. cutting steel

44. On a combine the cylinder loss is usually the lowest, but the cylinder concave clearance and cylinder speed adjustments have a great effect on the rack and shoe losses in the combine. Poor adjustments will show up from too little or too much threshing action. The threshing action may be increased by

A. increasing cylinder speed
B. decreasing cylinder speed
C. increasing the concave cylinder clearance
D. none of the above

45. As cylinder speed is increased greater than normal for the grain being harvested, the rack and shoe losses

A. increase
B. decrease
C. remain the same
D. none of the above

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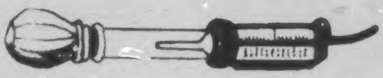
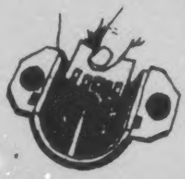
46. The piece of equipment shown is

A. a hydrometer
B. an injector pump tester
C. a dynanometer
D. none of the above



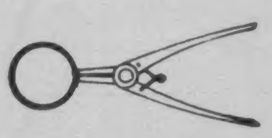
47. This picture shows a mechanic using plastigage.
Plastigage is used to

A. check engine bearing clearance
B. determine number of bushings needed
C. determine clearance required
D. measure curvature of main bearing wear



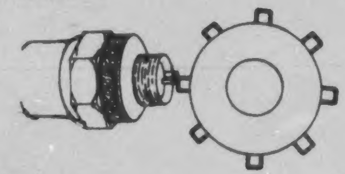
48. This picture shows the use of

A. water pump pliers
B. horseshoe lock ring pliers
C. snap ring pliers
D. hose clamp pliers



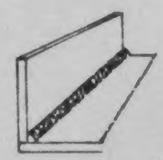
49. The operation being performed here is

A. cleaning a spark plug electrode
B. measuring the spark plug electrical resistance
C. checking and setting the spark plug gap
D. clipping the spark plug electrode



50. The weld joint shown below is

A. vertical butt
B. flat butt
C. fillet
D. none of the above



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51. Vertical arc welding in an upward direction as compared with welding the same material in flat position requires a current setting that is

A. the same as for flat position
B. lower than for flat position
C. higher than for flat position
D. none of these

52. The electrode which is especially adapted for arc welding high carbon steel is

A. tungsten carbide
B. monel metal
C. nickel
D. low hydrogen

53. The electrode which is especially adapted for arc welding cast iron is

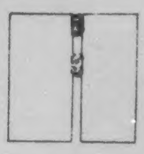
A. stainless steel
B. nickel
C. monel metal
D. stoodite

54. When welding 1/4" steel angle iron in a flat position, the electrode used should be approximately

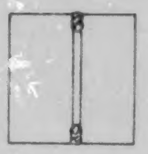
A. 1/16"
B. 1/8"
C. 1/4"
D. 1/2"

55. Which of the following procedures will give the least distortion when welding steel?

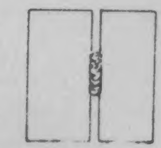
A.



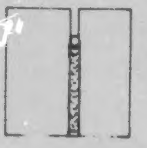
C.



B.



D.



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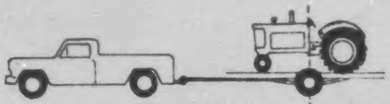
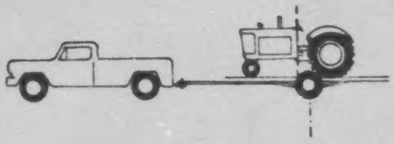
56. For towing purposes it is important to distribute the load weight correctly on the trailer. Choose the sketch below which represents the correct weight distribution for transport.

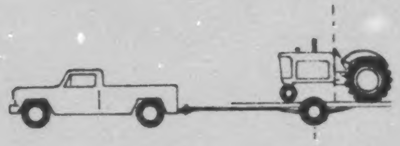
A.



B.



C.



D. None of the above

57. Choose the correct statement below about load binders.

A. They aren't really that important so don't bother with them.
B. They should be substantial enough to prevent shifting loads.
C. Should have a breaking strength equal to one-half the dead weight of the load.
D. Binders are never used on cleat-type tractors.

58. For unloading a crated riding mower from a truck, you should use a

A. fork lift
B. lift boom
C. wrecker
D. crane

59. In using a bench grinder to sharpen a flat cold chisel, the work pressure

A. should be directed at the side of a fine grain abrasive wheel
B. should be directed at the face of a fine grain abrasive wheel
C. should be directed at the side of a medium grain abrasive wheel
D. should be directed at the face of a medium grain abrasive wheel

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60. Which of the following would not be a proper stroke for use of a spray gun in painting a plow?

A. Uses free arm motion
B. Swings in a wide arc
C. "Triggers" the gun at each end of stroke
D. Keeps the gun parallel to surface

61. If it is necessary to have bulk storage of flammable materials (gasoline, paint thinner, etc.), then it should be

A. stored in 5 gallon cans
B. stored away from the buildings and covered
C. stored in the empty corner of the shop in safety can
D. stored but insured heavily

62. A friend of yours has become nauseous while cutting or welding galvanized surfaces. He should drink

A. all the water he can
B. a water and vinegar preparation
C. sweet milk
D. ice tea

63. The subsoil of land you are considering draining is yellow and red. This coloration is a good indication that the subsoil is

A. well drained
B. not well drained
C. a Cecil sandy loam
D. none of the above

64. The width between drainage ditches is most affected by the

A. depth of tile placing
B. length of tile system
C. diameter of drainage tile
D. width of field

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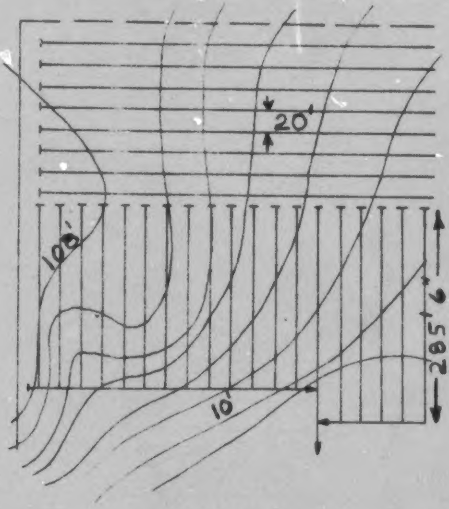
65. From looking at this layout, you can tell that the tile spacing is going to be

   A. 285' 6"
   B. 108'
   C. 10'
   D. 20'

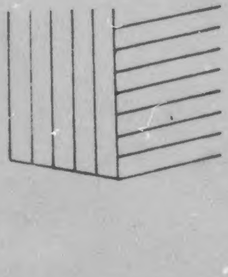


66. You plan to install 4,260 feet of plastic drainage tile. The cost of the tile will be approximately

   A. $ 4,260
   B. $ 1,278
   C. $ 850
   D. $ 225

67. The tile drainage system illustrated below is

   A. gridiron type
   B. double main type
   C. herringbone type
   D. parallel type



END OF TEST

APPENDIX C

OBJECTIVES

HORTICULTURE

OBJECTIVES
HORTICULTURE

A. Application of Fertilizer to Trees

1. Given a site with established trees, the student will demonstrate the proper method of taking a soil sample and will determine the need for fertilization by interpreting the results of the soil test.

2. Given several fixed analysis fertilizers, the student will determine the pounds of actual plant food in each.

3. Given trees exhibiting undersized or yellow leaves, sparce foliage, or little twig or branch growth, the student will determine the fertility needs of the plants.

4. Given liquid and granular fertilizer applicators, the student will calibrate and apply the needed materials to the landscape plants and will prepare the equipment for storage following use.

Test Items

Form A-3, Items 1, 2
Form B-1, Items 1, 2, 3, 4
Form B-2, Item 1
Form B-3, Item 1

B. Identification and Selection of Tree and Shrubs

1. Given a group of trees and shrubs common to the area, the student will correctly identify each by common name or by scientific name with the aid of references or an identification key.

2. Given sets of landscaping plans that call for plants by physical size and a tree and shrub list, the student will specify those plants that will fit the space.

3. Given a group of trees and shrubs, the student will select those that best meet the requirements for their intended function.

Test Items

Form A-1, Items 4, 5, 8, 9, 16, 18, 25, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39
Form A-2, Items 2, 10, 11, 17, 20, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 41, 42
Form A-3, Items 3, 5, 27, 28, 29
Form B-1, Items 5, 6, 7, 8, 9, 10
Form B-2, Items 2, 3, 4, 5, 65, 66, 67, 68, 69, 70
Form B-3, Items 3, 31, 33, 34, 35, 57, 59, 63

C. Pruning Trees and Shrubs and Hedges

1. Given an injured tree or shrub, the student will demonstrate the procedure for removing and/or repairing the injury.

2. Given a shrub in need of rejuvenation, the student will remove the necessary wood to restore the shrub's youthful appearance.

3. Given an odd shaped shrub, the student will use corrective pruning to develop a more balanced and compact appearance.

4. Given a formal hedge and the intended conformation, the student will shear it to maintain a thick and compact growth.

Test Items

Form A-1, Items 17, 24
Form A-3, Item 4
Form B-2, Item 44
Form B-3, Item 53

D. Planting Trees and Shrubs

1. Given a landscape plan and various types of trees and shrubs which are bareroot, balled and burlapped, the student will transplant each using the recommended procedure and practices.

2. Given trees needing protection from winter winds and temperatures, the student will properly wrap and stake the trees according to industry standards.

3. The student will demonstrate the recommended method of watering newly planted trees and shrubs.

4. Given an organic mulch material and sufficient hand tools, the student will apply a mulch to the trees and shrubs to conserve moisture, maintain an even soil temperature, and add to the beauty of the surroundings.

Test Items

Form A-3, Items 24, 25
Form B-1, Item 74
Form B-2, Items 59, 60
Form B-3, Items 27, 37, 60

E. Tree Maintenance Procedures

1. Given a tree damaged by insects and/or diseases, the student will demonstrate the ability to carry out the recommended control measures safely and will clean and store equipment used according to recommended procedures.

2. Given rope and a work order which requires rope to be used, the student will demonstrate the ability to tie the following knots and splices without the use of references: (a) bowline; (b) bowline on a bite; (c) clove hitch; (d) square knot; (e) sheet bend; (f) timber hitch; (g) half hitch; (h) tautline; (i) block.

3. Given a tree with a split fork or crotch, the student will demonstrate the ability to climb the tree and secure necessary cables and fasteners according to industry standards.

4. Given a tree in need of trimming or removal, the student will demonstrate the ability to climb the tree, remove limbs, and/or cut the trunk, and grind the stump according to recommended safe procedures.

Test Items

Form B-1, Item 12
Form B-2, Items 6, 7, 61
Form B-3, Items 2, 36, 56, 58, 61, 62, 64, 66

F. Planting Media Preparation

1. Given a choice of materials, the student will select those that meet basic requirements and prepare the following media: (a) rooting; (b) potting; (c) fine seeded

2. Given a chemical sterilant, the student will demonstrate the procedure, with proper safety precautions, in sterilizing a bench of media.

3. Given a bench of media needing sterilizing, the student will demonstrate the recommended method for steam sterilization.

Test Items

Form A-1, Item 19
Form B-1, Items 13, 14, 15
Form B-2, Item 74
Form B-3, Items 4, 38, 43

G. Fertilization of Floral Plants

1. Given a media sample, the student will determine if a soil conditioner is needed; and, if so, blend a suitable conditioner into a bench of media.

2. Given several fixed analysis fertilizers, the student will determine the pounds of actual plant food.

3. Using a concrete mixer, the student will add soil amendments (micronutrients) to plant media.

4. Using a liquid fertilizer applicator system, the student will demonstrate the procedure to fertilize a bench of media.

Test Items

Form A-3, Item 32
Form B-3, Items 39, 48

H. Greenhouse Plant Propagation

1. Given a sample of seed, the student will demonstrate the various steps in the seeding operation from seedbed preparation to the maintenance of seedbeds or seedrows.

2. Given various samples of seeds, the student will demonstrate proficiency in stratification and scarification treatment of seeds to improve germination.

3. Given various floral plants, the student will demonstrate proficiency in leaf-bud and leaf cuttings as methods of propagation and will prepare the cuttings for rooting.

4. Given various types of bulbs to be propagated, the student will demonstrate the ability to separate the slabs or offsets and replant in order to achieve rapid multiplication of bulbs.

Test Items

Form A-3, Items 33, 34, 35, 36

I. Maintaining Desirable Environmental Conditions in the Greenhouse

1. Given floral crops to be grown and an equipped greenhouse, the student will demonstrate the ability to operate the heating, ventilating, and cooling systems to maintain a specified temperature and humidity.
2. The student will demonstrate the ability to operate and maintain automatic watering systems and to hand water pot, bench and bedgrown crops according to specified procedures.
3. Given specific floral crops or a variety of floral crops, the student will operate and maintain lighting and shading systems according to specified procedures.
4. Given crops to be grown in the greenhouse and appropriate references, the student will determine the greenhouse environmental conditions needed for the crops.

Test Items

Form A-1, Items 10, 12
Form A-3, Items 38, 39
Form B-3, Item 42

J. Insect and Disease Control in the Greenhouse

1. Given floral plant specimens common to the area that are damaged by disease, insects or other pests, the student will be able to recognize the source of the damage, either on sight or by using a recognized reference.
2. The student will be able to carry out recommended procedures for controlling specific floral pest problems using chemicals, cultural and/or mechanical methods.
3. Given a variety of floral crops in a greenhouse, the student will be able to implement a preventative program for pest control.

Test Items

Form B-1, Item 16
Form B-2, Item 9

K. Use and Characteristics of Flowers, Plants and Decorative Materials

1. Given various common cut flowers found in the local floral businesses, the student will identify each by name and give its identifying characteristics.

2. Given foliage and flowering pot plants commonly found in local floral businesses, the student will be able to identify each by name and give its most common uses.

3. Given a variety of greens used for design work, the student will identify each and give its common uses in design.

4. The student must be able to recognize decorative materials such as containers, ribbons, netting and holding devices and be able to determine how each is used in flower design.

Test Items

Form A-1, Items 7, 13, 20, 23, 40, 42
Form A-2, Items 1, 4, 21, 23, 25, 26, 40, 43
Form A-3, Items 6, 37, 40
Form B-1, Items 17, 18, 19, 20, 72
Form B-2, Items 10, 11, 72
Form B-3, Items 41, 44, 45, 46, 68, 71

L. Arranging and Designing with Flowers and Decorative Materials

1. Given a variety of cut flowers, and decorative plant material and accessories, and an order for an arrangement, the student will select the basic design shape, an appropriate container and arrange the flowers using approved techniques to the satisfaction of the instructor.

2. Given adequate plant material and accessories and arrangement needed, the student will construct each of the following arrangements: (a) centerpiece; (b) hospital arrangement; (c) corsage; (d) basket (e) wedding bouquet.

Test Items

Form B-1, Items 21, 22, 23, 24
Form B-2, Items 12, 13, 14

M. Pruning Landscape Plants and Trees

1. Given an injured plant, the student will remove and/or repair the injury.
2. Given a shrub in need of rejuvenation, the student will remove the necessary work to restore the shrub's youthful appearance.
3. Given an odd shaped shrub, the student will use corrective pruning to develop a more balanced and compact appearance.
4. Given a formal hedge and the intended conformation, the student will shear it to maintain a thick and compact growth.

Test Items

Form B-1, Item 25
Form B-3, Item 29

N. Fertilizing Established Landscape Plants and Trees

1. The student will demonstrate the proper method of selecting a soil sample and determine the need for fertilizer.
2. Given several fixed analysis fertilizers, the student will determine the pounds of actual plant food.
3. Given landscape plants exhibiting undersized or yellow leaves, sparse foliage, or little twig growth, the student will determine the fertility needs of the plants.
4. Given liquid and granular fertilizer applicators, the student will calibrate and apply the needed materials to the landscape plants and prepare the equipment for storage following use.

Test Items

Form A-3, Item 7
Form B-1, Item 26
Form B-2, Items 15, 16, 17

O. Watering and Weed Control of Landscape Plants

1. Given various types of watering equipment and landscape plants, the students will select the most appropriate equipment to use to supply the moisture needs of the area.

2. Given a specific type of landscape planting, the student will determine the amount and frequency of watering needed to provide the necessary moisture.

3. Given a situation of weed infestation of a landscaped area, the student will recognize the problem and carry out the appropriate chemical, cultural, and/or mechanical procedures necessary for controlling weeds.

4. Given chemical weed control sprayers, the student will demonstrate the ability to properly mix and apply the spray material and clean the equipment for storage.

Test Items

Form B-1, Items 27, 28, 29
Form B-2, Item 18
Form B-3, Item 72

P. Planting Landscape Plants and Trees

1. Given a landscape plan and various types of plants which are bareroot, balled and burlapped, and container grown stock, the student will transplant the plants using the recommended practices.

2. Given trees needing protection from winter winds and temperatures, the student will properly wrap and stake the trees.

3. The student will demonstrate the recommended method of watering newly-planted stock.

4. Given an organic mulch material and adequate hand tools, the student will apply a mulch to the landscape plantings to conserve moisture, maintain an even soil temperature, and add to the beauty of the landscape.

Test Items

Form A-3, Items 30, 31
Form B-1, Item 30

Q. Landscape Insect and Disease Control

1. Given ten landscape plant specimens damaged by disease, insects or pests, the student will be able to recognize the source of the damage, either on sight or using a recognized reference.
2. Given a recognized reference and landscape plant specimens, the student will be able to determine recommendations for control of certain pests.
3. The student will be able to carry out recommended procedures for controlling specific plant pest problems.
4. Given a landscaped area, the student will be able to implement a preventative program for pest control.

Test Items

Form A-2, Items 5, 6, 7, 8
Form A-3, Items 8, 9
Form B-1, Items 31, 32
Form B-2, Item 19
Form B-3, Item 49

R. Landscape Site Preparation

1. Given a site to landscape, the student will collect representative soil samples for testing.
2. Given a site to landscape, the student will make the soil changes needed based on the soil test results.
3. Given a site to landscape, the student will use hand tools to grade and drain the site according to the landscape plans.
4. Given a site to landscape, the student will construct walls, patios, walks, and other structures according to the landscape plans.

Test Items

Form B-2, Item 20
Form B-3, Item 73

S. Planting Media Preparation

1. Given a choice of materials, the student will select those that meet basic requirements and prepare the following media: (a) rooting (b) potting; (c) fine seeded.
2. Given a chemical sterilant the student will demonstrate the procedure, with proper safety precautions, in sterilizing a bench of media.
3. Given an organic mulch material and adequate hand tools, the student will apply a mulch to young nursery stock.

Test Items

Form B-1, Item 33
Form B-2, Items 8, 21

T. Fertilization of Nursery Stock

1. Given a media sample, the student will determine if a soil conditioner is needed and, if so, blend a suitable conditioner into a bench of media.
2. Given several fixed analysis fertilizers, the student will determine the pounds of actual plant food.
3. Given correctly calibrated liquid and granular fertilizer applicators, the student will apply a prescribed amount of materials to a given plot and prepare the equipment for storage following use.
4. Using a concrete mixer, the student will add soil amendments (micronutrients) to plant media.

Test Items

Form B-1, Items 34, 35, 36, 70
Form B-2, Item 22
Form B-3, Items 5, 47

U. Identification and Selection of Nursery Stock

1. Given a group of trees and shrubs common to the area, the student will correctly identify and select those that are in the best condition for transplanting.

2. Given sets of landscaping plans that call for plants by physical size and a plant list, the student will specify a plant that will fit the space.

3. Given a group of trees and shrubs, the student will select plants that best meet the requirements for their intended function.

Test Items

Form A-3, Item 10
Form B-1, Items 37, 38, 39, 40
Form B-2, Item 23
Form B-3, Items 32, 51, 54, 65, 67

V. Planting and Transplanting Nursery Stock

1. Given samples of seedlings, the student will identify the samples that are ready for transplanting.

2. Given four different kinds of plant containers, the student will select the proper container for planting annuals according to intended use by consumer.

3. Given various nursery plants, the student will demonstrate the primary methods to harden plants for transplanting.

4. Given suitable specimens of a variety of three trees and the necessary supplies, the student will correctly dig, ball, and burlap the specimens.

5. The student will demonstrate the proper method of watering newly planted stock.

Test Items

Form A-1, Item 43
Form B-1, Items 11, 73, 75, 76
Form B-2, Item 73
Form B-3, Items 6, 28, 75, 76

W. Sexual Propagation

1. Given various samples of seeds, the student will demonstrate proficiency in treating seeds for germination, i.e. stratification and scarification.

2. Given a sample of seed, the student will demonstrate the various steps in the seeding operation from seedbed preparation to the maintenance of seedbeds or seedrows.

Test Items

Form A-3, Item 11
Form B-1, Items 41, 42, 43

X. Propagation by Cuttings

1. Given a group of hardwood stem parts and a knife, the student will prepare specimens for mist bed propagation according to recognized criteria.

2. Given a group of softwood stem parts and a knife, the student will prepare specimens for mist bed propagation according to recognized criteria.

3. The student will prepare benches of stem cuttings for effective root development under natural and controlled conditions (misting).

4. The student will properly control and maintain environmental conditions necessary for mist bed propagation.

Test Items

Form B-1, Items 44, 45, 46, 47
Form B-2, Item 24
Form B-3, Items 7, 8, 55

Y. Grafting and Budding

1. Given the necessary tools and materials, the student will demonstrate the correct technique for (a) whip grafting and (b) cleft grafting.

2. Given a variety of plants, the student must be able to propagate all varieties by grafting or budding, whichever method is best suited for the plant and intended purpose.

Test Items

Form A-3, Items 13, 14, 15
Form B-1, Items 48, 49, 50, 51, 52
Form B-2, Items 25, 26, 27, 28, 29
Form B-3, Items 9, 10, 52

Z. Pruning Nursery Stock

1. Given a set of plants and the purpose(s) of pruning each, the student will correctly prune each plant.

2. Given a set of recently pruned plants, the student will demonstrate the correct procedure (s) of caring for cuts.

3. Given a set of plants with one or more of the following injuries (a) cold injuries or (b) pest or disease injuries, the student will demonstrate the correct procedure for removing and caring for these injuries.

Test Items

Form A-1, Item 41
Form A-2, Item 16

AA. Nursery Weed Control

1. Given a situation of various weeds growing in ornamental plants, the student will correctly identify the weed and select and conduct appropriate procedures and processes necessary for controlling the weeds.

2. Given a situation of various weeds growing in a group of container plants, the student will correctly identify the weeds and select and conduct appropriate procedures and processes necessary for controlling the weeds.

3. Given chemical weed control sprayers, the student will demonstrate the ability to properly calibrate the sprayer and, following use, clean the equipment for storage.

Test Items

Form A-1, Item 27
Form A-2, Items 12, 15

BB. Nursery Disease and Insect and Pest Control

1. Given plant specimens damaged by disease, insects or pests, the student will be able to recognize the source of the damage, either on sight or using a recognized reference.

2. Given a recognized reference and nursery stock specimens, the student will be able to determine recommendations for control of certain pests.

3. The student will be able to carry out recommended procedures for controlling specific plant pest problems.

4. Given a nursery field plot of container stock, the student will be able to implement a preventative program for pest control.

Test Items

Form A-1, Item 22
Form A-2, Item 39
Form A-3, Item 12
Form B-1, Item 53

CC. Safe Use of Pest Control Chemicals

1. Students should be able to recognize from labels the type of pest that a particular pesticide is designed to control.
2. Given various pesticides, the student should be able to demonstrate the precautions to be taken when handling and mixing pesticides.
3. Students should be able to demonstrate safe procedures to be followed when applying pesticides.
4. Given surplus pesticides and containers, the students should be able to demonstrate the procedure for safe disposal and storage.
5. Students should be able to select the most appropriate pesticide for a given problem.
6. Students should be able to follow various legal restrictions when using pesticides.

Test Items

Form B-1, Item 69
Form B-2, Items 62, 63, 64
Form B-3, Item 30

DD. Selecting Turfgrasses for New Plantings

1. Given the intended use of a particular turf area, such as golf greens and lawns, the student will select the best species or varieties to use.
2. Given a set of environmental and soil conditions for a specific turf area, the student will select the most appropriate species or mixtures of turfgrass (es) to use.
3. Given a set of management practices for a turf area, the student will select the most appropriate varieties for establishment.
4. Given an established turf area, the student will identify the common turfgrasses growing in the area.

Test Items

Form A-3, Item 16
Form B-1, Items 54, 55
Form B-2, Items 30, 31, 32
Form B-3, Items 11, 12

EE. Turf Site Preparation

1. Given a planned turf site, the student will recognize areas which indicate a need for sub-surface drainage.

2. Given a rough graded turf site with adequate sub-surface drainage, student will perform those operations necessary to provide for surface drainage of the turf site.

3. Given a rough graded and drained turf area, the student will prepare the seedbed soil surface by using small engine powered or tractor-driven tillage equipment.

4. Given a graded and drained turf area, the student will apply lime and fertilizer as recommended by soil test results and will incorporate these materials into the soil to assure meeting nutrient needs of the grasses to be planted.

Test Items

Form A-3, Item 17
Form B-1, Items 56, 57, 58
Form B-2, Items 33, 34
Form B-3, Items 13, 69, 70

FF. Turf Establishment By Seeding and Vegetatively Planting

1. Given a prepared turf site, the student will be able to demonstrate proper seeding procedures for establishing a productive and manageable turf.

2. The student will be able to demonstrate the proper procedure for removing sod from established sod producing areas and transplant the sod in a prepared turf site.

3. Given a commonly used mulching material, the student will demonstrate the proper method of mulching a newly seeded turf area to insure improved establishment.

4. Given a prepared turf site, the student will demonstrate the proper method of vegetative turf establishment by stolonizing.

Test Items

Form A-1, Item 14
Form A-3, Item 18, 19
Form B-1, Items 59, 60
Form B-2, Items 35, 36, 37, 38, 39, 40
Form B-3, Items 14, 15

GG. Renovating Old Turf Areas

1. Given an old turf in poor condition, the student will determine the cause (s) of low productivity and decide if renovation will correct the poor condition or if reconstruction is the most feasible corrective measure.

2. Given the cause (s) of poor condition in an old turf area that can be renovated, the student will determine the procedures and/or processes necessary to correct the poor condition of the turf area and will demonstrate these procedures.

Test Items

Form B-1, Item 61
Form B-2, Items 41, 42, 43, 45
Form B-3, Items 16, 40, 50

HH. Maintaining Turf Fertility

1. Given a specific turf area, the student will be able to take a soil sample and prepare the sample for analysis by a recognized soil testing laboratory.

2. Given a soil test report, the student will interpret the recommendations in terms of amount, rate and analysis of fertilizer to apply.

3. Given a set of fertilizer recommendations, the student will select the most efficient and economical fertilizers for the turf area and apply the fertilizer and/or lime according to recommended procedures.

Test Items

Form B-1, Items 62, 63, 64, 71
Form B-2, Items 46, 47, 48, 49, 50, 51, 71
Form B-3, Items 17, 18, 19, 20, 74

II. Mowing Turf Areas

1. Given a specific type of turf area (lawn, fairway, golf green, etc.), the student will select the equipment needed to mow the turf area according to its intended use.
2. Given various types of mowing equipment, the student will properly adjust the equipment for cutting height according to the type of turf area to be mowed.
3. Given properly adjusted mowing equipment, the student will demonstrate those processes and procedures necessary for mowing a variety of turf areas and turfgrasses.
4. Given properly adjusted aerating and thatching equipment, the student will demonstrate the ability to operate this equipment in order to maintain a given type of turf area.

Test Items

Form A-3, Items 20, 21
Form B-1, Items 65, 66
Form B-2, Items 52, 53, 54
Form B-3, Items 21, 22

JJ. Watering Turf Area

1. Given various types of watering equipment, the turf variety (ies) and the use of the turf area, the students will select the most appropriate equipment to use to supply the moisture needs of the area.
2. Given a specific turf area, the student will determine the amount and frequency of watering needed and perform those procedures which will meet the turf area's moisture needs.

Test Items

Form A-1, Item 15
Form A-3, Item 22
Form B-2, Item 55
Form B-3, Item 23

KK. Turf Weed Control

1. Given a situation of weed infestation of a turf area, the student will be able to recognize the problem and carry out the appropriate chemical, cultural and/or mechanical procedures and processes necessary for controlling the weeds.
2. Given chemical weed control sprayers, the student will demonstrate the ability to properly calibrate the sprayer, and following use, clean the equipment for storage.

Test Items

Form A-2, Items 3, 14
Form B-2, Item 56

LL. Turf Disease, Insect, and Pest Control

1. Given turf specimens common to the area damaged by disease, insects or other pests, the student will be able to recognize the source of the damage, either on sight or by using a recognized reference.
2. The student will be able to carry out recommended procedures for controlling specific turf pest problems using chemicals, cultural and/or mechanical methods.
3. Given a turf area, the student will be able to implement a preventative program for pest control.

Test Items

Form A-1, Items 1, 2, 3, 6
Form B-1, Item 67
Form B-2, Items 57, 58
Form B-3, Items 24, 25

MM. Hand and Power Tools and Hardware Used in Ornamental Horticulture

1. Given various kinds of hand and power tools used in ornamental horticulture, the student will be able to correctly identify the tools and describe their uses using proper tool nomenclature at a level of performance established by the instructor.

2. Presented various kinds of hardware commonly used on horticultural equipment, the student will be able to correctly identify the hardware by using the proper nomenclature and describe the use of the hardware at a level of performance acceptable to the teacher.

3. Provided equipment requiring the use of various tools and/or hardware in order to repair or service the equipment, the student will be able to select the proper tools and/or hardware to complete the service or repair and use the tools and hardware at a level of performance acceptable to the instructor.

4. Presented selected items of tools in need of repair or requiring general maintenance, the student will be able to make such repairs or perform such general maintenance procedures to a level of performance acceptable to the instructor.

5. Provided selected tools and power equipment, the student will exhibit safe operating procedures for the various tools to the satisfaction of the teacher or an employer.

Test Items

Form A-1, Items 11, 21, 26, 41, 43
Form A-2, Items 9, 13, 16, 18, 19, 22, 24, 27, 38, 39

NN. Operation and Care of Small Gasoline Engines

1. The student should be able to identify the two basic types of small gasoline engines and explain their principles of operation with accuracy needed to differentiate between them.

2. The student should be able to use the proper procedures for preparing to start and starting a small gasoline engine including refueling to prevent starting troubles and accidents.

3. The student should be able to operate, adjust engine speed and load, and stop small gasoline engines using procedures which promote optimum engine efficiency and operator safety.

4. The student should be able to properly clean a small gasoline engine to prevent overheating and excessive wear due to dirt entering the engine.

5. The student should be able to prepare a small gasoline engine properly for storage of three or more months duration to prevent corrosion and damage.

Test Items

Form A-3, Item 23
Form B-1, Item 68

OO. Maintenance of Small Gasoline Engines

1. The student should be able to identify the different types of carburetor air cleaners commonly found on small gasoline engines and clean and service them according to the manufacturer's specifications.

2. The student should be able to identify the three types of fuel strainers commonly found on small gasoline engines and clean and service them according to the manufacturer's specifications.

3. The student should be able to select the right kind of oil, keep the proper crankcase oil level, and change the oil in a four stroke cycle engine according to the manufacturer's specifications for small gasoline engines.

4. The student should be able to select and service the spark plug on two and four stroke cycle engines according to manufacturer's specifications.

5. The student should be able to identify the principles of carburetor operation in small gasoline engines and adjust the carburetor valves on common small gasoline engines for most efficient performance.

Test Items

Form B-2, Items 75, 76
Form B-3, Item 26

APPENDIX D

MASTERY TESTS

HORTICULTURE

- Form A-1
- Form B-1
- Form A-2
- Form B-2
- Form A-3
- Form B-3

FORM A-1

HORTICULTURE MASTERY TEST

1. This slide shows

   A. red spider mites
   B. aphids
   C. ants
   D. rust

2. This slide shows an example of

   A. black spot
   B. brown patch
   C. rust
   D. apple scab

3. This slide shows

   A. scale
   B. powdery mildew
   C. mealy bug
   D. anthracnose

4. This is an example of

   A. oak leaves
   B. maple leaves
   C. ash leaves
   D. beech leaves

5. This is an example of

   A. Tallhedge Buckhorn
   B. Flowering Quince
   C. Washington Hawthorn
   D. Spreading Cotoneaster

6. This slide illustrates

   A. phosphorus deficiency
   B. fire blight
   C. chlorosis
   D. weed killer injury

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7. This flower pictured is a

   A. Jonquil
   B. Crocus
   C. Tulip
   D. Iris

8. This slide is an example of

   A. Spreading Cotoneaster
   B. Flowering Quince
   C. American Holly
   D. Washington Hawthorn

9. This is an example of

   A. Variegated Honeysuckle
   B. Variegated Wigelia
   C. Variegated Euonymous
   D. None of the above

10. This picture shows two forms of

    A. fertilizer pellets
    B. jiffy - 7
    C. pressed mulches
    D. soil conditioners

11. This machine is used to

    A. sterilize soil
    B. apply soil nutrients
    C. spread dry mulch
    D. shred soil

12. This device is used in greenhouses to

    A. heat water
    B. cool water
    C. heat air
    D. cool air

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13. This flower is
    - A. an Easter Lily
    - B. a Peony
    - C. a Poinsettia
    - D. a Calendula

14. This picture shows an example of
    - A. application of liquid fertilizer
    - B. emulsified application of mulch
    - C. hydrowatering
    - D. hydroseeding

15. This picture shows an example of
    - A. a spray nozzle for herbicide
    - B. an insecticide spray nozzle
    - C. a water fogger
    - D. an impact sprinkler

16. This picture shows an example of
    - A. Oregon Grape Holly
    - B. Hetz Japanese Holly
    - C. Azaleas
    - D. Rhododendron

17. This picture shows an example of
    - A. topiary
    - B. espalier
    - C. arbor
    - D. none of the above

18. This decorative plant is
    - A. Wegelia
    - B. a Rubber Plant
    - C. Forsythia
    - D. Common Lilac

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19. This procedure is used to

    A. fumigate soil
    B. maintain soil moisture
    C. control soil temperature
    D. keep plants from starting to grow

20. This slide illustrates

    A. Snapdragons
    B. Narcissus
    C. Easter Lilies
    D. Daffodils

21. This tool is

    A. a spike tooth harrow
    B. a U blade
    C. a root snaffler
    D. a subsoil plow

22. This leaf problem is

    A. chlorosis
    B. anthracnose
    C. scale
    D. leaf miner damage

23. These flowers are

    A. roses
    B. marigolds
    C. chrysanthemums
    D. asters

24. The cultural practice shown here is

    A. an espalier
    B. a topiary
    C. an arbor
    D. a trellis

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25. This plant is an example of

A. Norway Spruce
B. Red Pine
C. Blue Rug Juniper
D. Mugho Pine

26. This machine is

A. a grass flail chopper
B. a vacuum
C. a mower with a clipping bag attachment
D. a rock harvester

27. This plant is an example of

A. Poison Ivy
B. Smartweed
C. Foxtail
D. Nimblewill

28. This tree is a

A. London Plane
B. Red Maple
C. Silver Maple
D. Norway Maple

29. This is an example of

A. Pin Oak
B. Red Oak
C. White Oak
D. Willow Oak

30. This slide is an example of

A. Littleleaf Linden
B. Lilac
C. Katsuratree
D. Eastern Redbud

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31. This slide is an example of

A. Red Oak
B. Pin Oak
C. Scarlet Oak
D. White Oak

32. This slide is an example of

A. Golden Raintree
B. Honeylocust
C. Mimosa
D. Japanese Pagodatree

33. This slide is an example of

A. Tuliptree
B. Silver Maple
C. American Sweetgum
D. none of the above

34. This slide is an example of

A. Ohio Buckeye
B. Persimmon
C. Russian Oliver
D. Katsuratree

35. This is an example of

A. Norway Maple
B. Hedge Maple
C. London Plane
D. Sugar Maple

36. This is an example of

A. Common Box
B. Cranberry Cotoneaster
C. Convexleaf Japanese Holly
D. Firethorn

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37. This is an example of

A. viburnum
B. dogwood
C. chestnut
D. none of the above

38. This tree is

A. a Red Maple
B. a Silver Maple
C. a London Plane
D. an Ohio Buckeye

39. This picture shows an example of

A. Convexleaf Japanese Holly
B. Dwarf Privet
C. Rhododendron
D. American Holly

40. These flowers are called

A. Irises
B. Tulips
C. Gladiolus
D. Petunias

41. The tool being used here is

A. hand shears
B. loping shears
C. tree trimmers
D. none of the above

42. These flowers are

A. Petunias
B. Tulips
C. Gladiolus
D. Snapdragons

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43. This attachment on the bobcat is called a

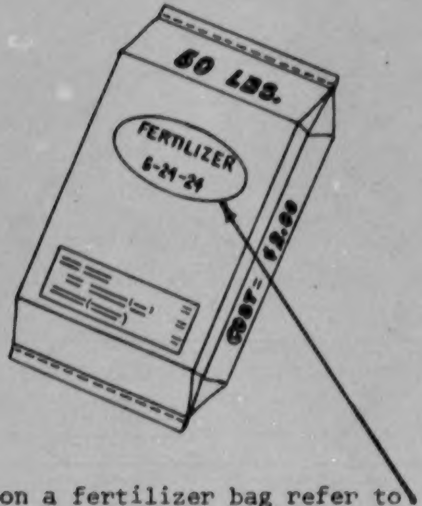
A. tree topper
B. tree sprayer
C. tree spade
D. pruning platform

END OF TEST

FORM B-1

HORTICULTURE MASTERY TEST

Questions 1 through 4 refer to this drawing:



1. These three numbers on a fertilizer bag refer to

   A. the fertilizer grade
   B. the per cent of major plant nutrients
   C. the ratio of major plant nutrients
   D. all of the above

2. How many pounds of available phosphate are there in this bag of fertilizer?

   A. 6 lbs.
   B. 8 lbs.
   C. 12 lbs.
   D. 24 lbs.

3. How many pounds of potash are there in this bag of fertilizer?

   A. 6 lbs.
   B. 8 lbs.
   C. 12 lbs.
   D. 24 lbs.

4. Approximately how much would each pound of available phosphate cost if we were only considering phosphate nutrients?

   A. 15¢
   B. 17¢
   C. 25¢
   D. 33¢

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5. The leaves of the maple tree are

A. serrated
B. lobed
C. entire
D. partial

6. The leaves of red oak are

A. entire
B. serrated
C. lobed
D. partial

7. The leaf arrangement of the Thornless Honeylocust is

A. opposite-simple
B. opposite-compound
C. twice pinatly compound
D. simple

8. The point at which leaves arise from the stem is called

A. an internode
B. a node
C. an axil
D. a limb

9. Which of the following should *not* be used in a foundation planting?

A. Taxus Media "Browni"
B. Pfitzer Juniper
C. Blue Spruce
D. All of the above

10. In the name *Gymnocladus dioicus*, the word "*dioicus*" refers to

A. specific epithet (species)
B. cultivar
C. genus
D. family

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11. Generally transplant nursery stock

A. 2" above existing grade
B. set at same level as grown in nursery
C. 2" below grade
D. it does not matter

12. The tissue responsible for stem diameter increases is the

A. cambium
B. cortex
C. pith
D. phloem

13. A suitable potting media contains 50% peat and 50% fine vermiculite.

A. True
B. False

14. A common soil fumigant is

A. methyl bromide
B. captan
C. benlate
D. endrin

15. How many days must soil be aired after treatment by methyl bromide?

A. One day
B. Ten days
C. Fourteen days
D. Thirty days

16. Red Spiders on roses are controlled by

A. malathion
B. terrachlor
C. kelthane
D. lead arsenate

17. Which material is not a commonly used holding device in floral design?

A. Styrofoam
B. Chicken wire
C. Greens (foliage)
D. Sand

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18. Which of the following cut flowers is relatively sensitive to temperature and should be stored at a temperature above 55°F?

A. Rose
B. Carnation
C. Chrysanthemum
D. Orchid

19. Which of the following greens has the poorest keeping quality when not used in water?

A. Huckleberry
B. Asparagus Fern
C. Baker Fern (Leatherleaf Fern)
D. Salal (Lemonleaf)

20. Which of the following flowers is shipped in a vial of water?

A. Bird of Paradise
B. Orchid
C. Gardenias
D. Roses

21. Which foliage would be most appropriate for constructing a boutonniere?

A. Salal
B. White Pine (Emerald Leaf)
C. Baker Fern (Leatherleaf Fern)
D. Huckleberry

22. Which are primary colors when considering flowers for an arrangement?

A. Blue, yellow and red
B. Blue, yellow and green
C. Blue, red and green
D. Yellow, red and green

23. The maximum number of different types of flowers which should ordinarily be used in a design is

A. 3
B. 4
C. 5
D. 6

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24. Which flowering pot plant is marketed throughout the year?

A. Chrysanthemums
B. Poinsettia
C. Easter Lily
D. Geranium

25. Spirea and forsythia should be pruned

A. in early spring
B. when dormant
C. after flowering
D. at any time

26. To raise the pH of a soil you would add

A. hydrated lime
B. calcium sulfate
C. iron sulfate
D. liquid nitrogen

27. Water is translocated from the roots to the leaves of trees through the

A. phloem tissue
B. cortex tissue
C. xylem
D. cambium

28. The soil water available to plants is

A. hydroscopic water
B. capillary water
C. gravitational water
D. none of the above

29. A herbicide is used to control

A. insects
B. diseases
C. plants
D. all of the above

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30. You purchase 100 bare root privet hedges to plant along your property line. They are wrapped in bundles of 25. You begin the task but are stopped halfway through. What would you do with the bundles that had not been planted?

A. Layer
B. Harden-off
C. Heel-in
D. Girdle

31. Maple bladder gall can be controlled by spraying at the bud stage in the spring with

A. sevin
B. malathion
C. copper sulfate
D. 2,4-D

32. 2,4-D is recommended for the control of

A. buckhorn plantain
B. quackgrass
C. crabgrass
D. nimblewill

33. Organic matter added to the soil

A. adds large amounts of fertilizer
B. improves soil structures
C. decreases the texture
D. all the above

34. Which of the following plants does not require acid soils?

A. Japanese Pieris
B. Japanese Holly
C. Rhododendron
D. All the above

35. Which of the following elements is least available to plants in a highly alkaline soil?

A. Potassium
B. Phosphorus
C. Iron
D. Nitrogen

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36. For plants requiring acid soils, the pH of the soil should be in what range?

A. 4.5 to 6.0
B. 6.0 to 7.5
C. 7.5 to 9.0
D. 9.0 to 9.5

37. In drawing a landscape plan, you realize that you must keep plants and buildings in scale. In measuring your property you find that one bush is 12' away from the N.E. corner of the house. On a landscape plan with a scale of 1/4" this distance would be equal to

A. 1/4 of an inch on the plan
B. 1 inch on the plan
C. 3 inches on the plan
D. 2 1/2 inches on the plan

38. Betula pendula (European White Birch) is not commonly recommended for landscaping due to a problem with

A. boron deficiency
B. birch borer
C. white fly
D. leaf miner

39. A ground cover plant which will not grow well in sunny areas is

A. Periwinkle
B. Pachysandra
C. Ajuga
D. Hedera Helix

40. A very fast growing tree is

A. Sugar Maple
B. Honeylocust
C. Littleleaf Linden
D. Pin Oak

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41. The division of a clone of plants is known as

A. sexual propagation
B. asexual propagation
C. none of these
D. both A and B

42. Which of the following factors contributes the least in germination of seeds?

A. Light
B. Temperature
C. Moisture
D. Nitrogen level

43. Air layering is a method of

A. sexual propagation
B. asexual propagation
C. neither A nor B but a form different from either one
D. controlling diseases on plants

44. If you plan to store hardwood cuttings that are collected in the fall, they should be kept where the temperature is between

A. 0° and 20°F
B. 32° and 40°F
C. 40° and 60°F
D. 80° and 100°F

45. Cuttings of softwood shoots are generally

A. 1 to 2 inches long
B. 2 to 3 inches long
C. 4 to 6 inches long
D. 7 to 12 inches long

46. Softwood cuttings from most deciduous shrubs are made in

A. early summer
B. late summer
C. fall
D. early spring

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47. Callus may form on plants

A. which have powdery milden
B. which are being rooted
C. which are being hardened off
D. which are infected with virus

48. Whip grafting works best when stock and scion are about

A. 1/4 and 3/8 inch in diameter
B. 1/16 and 1/8 inch in diameter
C. 1/2 and 3/4 inch in diameter
D. over 1 inch in diameter

49. Cleft grafts are most successfully made on stubs approximately

A. 0 to 1 inch in diameter
B. 1 to 2 inches in diameter
C. 2 to 3 inches in diameter
D. 5 to 10 inches in diameter

50. A whip is normally known as

A. a seedling
B. a pruned-off branch
C. a scion
D. none of these

51. A method of propagation where the new plant gets its food and water supply from the mother plant is known as

A. division
B. layering
C. graftage
D. none of these

52. Budding is a method of

A. sexual propagation
B. asexual propagation
C. apomixis
D. layering

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53. European Mountain Ash is generally not recommended as a landscape plant due to a problem with

A. trunk borer
B. white flies
C. nematodes
D. aphids

54. Which grass has similar management requirements and usually is included with Kentucky bluegrass in lawn mixtures in Ohio?

A. Rough Bluegrass
B. Creeping Red Fescue
C. Annual Bluegrass
D. Tall Fescue

55. Athletic fields and playground turf usually contain which of the following?

A. Bentgrass
B. Danish Bluegrass
C. Tall Fescue
D. None of the above

56. A good soil for root development has

A. 50% air space, 25% solid matter, and 25% water
B. 50% solid matter, 25% air space, and 25% water
C. 50% water, 25% air space, and 25% solid matter
D. 50% solid matter and 50% water

57. Football fields are "crowned" to

A. provide proper drainage of excess surface water
B. provide proper drainage of excess subsurface water
D. meet the rules of the game
D. reduce injury to players

58. Soil granulation is desirable because it

A. tends to improve aeration and drainage
B. decreases the amount of air
C. breaks down the soil structure
D. all the above

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59. The minimum percentage of germination for most kinds of grass seed should be

A. about 75 per cent
B. about 80 per cent
C. about 85 per cent
D. about 90 per cent

60. The best time to establish a lawn in the central Ohio area is

A. mid July
B. mid May
C. mid September
D. mid February

61. The best time to renovate a lawn is

A. late spring and early summer
B. late summer and early fall
C. either early spring or late fall
D. either late spring or early fall

62. Which is the best organic material to use as a physical conditioner for a turfgrass soil?

A. Manure
B. Sawdust
C. Peat
D. Cocoa hulls

63. Thatch is the result of

A. a nutrient deficiency
B. insect damage
C. poor soil drainage
D. an accumulation of dead plant material

64. When selecting a soil sample to determine the need for fertilizer, the best tool to use is a

A. hoe
B. scoop shovel
C. auger
D. backhoe

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65. In selecting a mowing height for golf fairways, consideration should be given to the maintenance requirements of the grass species and to playing conditions. Which of the following mowing heights would you select to meet both needs if the fairway was seeded primarily with Kentucky Bluegrass?

A. 3/4 to 1 inch
B. 1 to 1 1/4 inch
C. 1 3/4 to 2 inches
D. 2 1/2 to 3 1/2 inches

66. A Kentucky Bluegrass lawn is mowed at a height of

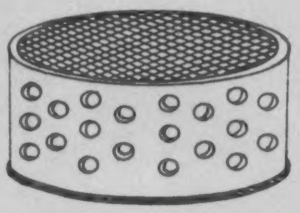
A. 1/4 to 1/2 inch
B. 2 to 2 1/2 inches
C. 3 to 4 inches
D. 5 to 6 inches

67. The chemical 2,4-D is used for weed control. Which weed is not killed by 2,4-D?

A. Yellow rocket
B. Buckhorn
C. Crabgrass
D. Curly dock

68. This is one type of air cleaner that is used on small engines for equipment used in horticulture. It is called a

A. dry type air cleaner
B. oil foam air cleaner
C. oil bath air cleaner
D. ceramic filter air cleaner



69. AIA stands for

A. Agricultural Inspection Agency
B. Amount of active chemical ingredient to apply per acre
C. Amount of light intensity applied
D. Amount of insecticide application per cubic foot

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70. All of the following could be used to lower soil pH except

A. iron sulfate
B. sulfur
C. aluminum sulfate
D. sodium sulfate

71. A soil test indicates that five pounds each of P_2O_5 and K_2O are needed for each 1000 square feet of bed area. How many pounds of 5-10-5 would be necessary to insure adequate amounts of both in a 2,000 sq. ft. bed?

A. 200 lbs. of 5-10-5
B. 100 lbs. of 5-10-5
C. 10 lbs. of 5-10-5
D. 2,000 lbs. of 5-10-5

72. Which of the following statements is true?

A. Hardy bulbs should be lifted each year in October
B. Hardy bulbs should be planted in early spring
C. Non-hardy bulbs should be planted in early March
D. Hardy bulbs should be planted in early fall

73. Which of the following is most likely to cause a root growth problem in transplanting nursery stock?

A. Planting a clay loam ball in sandy soil
B. Planting a bare-root plant in clay loam soil
C. Heeling a clay loam ball into peat and wood chips during the spring for six weeks
D. Planting a container plant grown in hardwood bark in clay soil

74. When transplanting deciduous trees, about one-third of the top growth may be removed. This pruning is done primarily to

A. develop a desirable shape
B. make handling the tree easier
C. make the top more compact
D. compensate for roots lost during digging

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75. Which of the following statements is false?

A. Balled and burlapped plants should be handled by the ball.
B. Untreated burlap should be removed before planting.
C. The top rim of peat pots should be broken off or carefully planted underground.
D. Trunks of trees with thin smooth bark should be protected by wrapping.

76. Which of the following statements is incorrect?

A. Transplant nursery stock so that the best side will be most frequently seen.
B. Mix 20-20-20 fertilizer into the backfill before covering roots with it.
C. When roots are half to two-thirds covered, tamp the soil and soak well with water before proceeding.
D. Use soil to form a basin or dish around the plant.

END OF TEST

FORM A-2

HORTICULTURE MASTERY TEST

1. This slide illustrates

   A. Orchid
   B. African Violet
   C. Rose
   D. Carnation

2. This is an example of

   A. maple leaves
   B. oak leaves
   C. chestnut leaves
   D. tuliptree leaves

3. This weed pictured is

   A. Bindweed
   B. Quackgrass
   C. Smartweed
   D. Nimblewill

4. This slide illustrates

   A. Marigold
   B. Chrysanthemum
   C. Aster
   D. Dahlia

5. This slide shows

   A. apple scab
   B. rose black spot
   C. rust
   D. brown patch

6. If this bag of snail pellets cost $5, how much would each pound of active ingredients cost?

   A. $1.00
   B. $2.50
   C. $5.00
   D. $50.00

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7. This slide shows damage by

A. bagworm
B. helminthosporium
C. tent caterpillar
D. red spider mite

8. This slide shows

A. bagworm
B. tent caterpillar
C. red spider mite
D. fall webworm

9. This tool pictured is a

A. cross cut saw
B. bow saw
C. treble saw
D. coping saw

10. This is an example of

A. Common Privet
B. Slender Deutzia
C. Mollis Azalea
D. Winged Euonymous

11. This slide is an example of

A. Winged Elm
B. Burkwood Viburnum
C. Winged Euonymous
D. White Fringetree

12. This weed is a

A. Nut Sedge
B. Common Chickweed
C. Bullthistle
D. Buckhorn Plantain

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13. This picture shows an example of

A. watering by chapin system
B. an automatic siphoning
C. an automatic chemical applicator
D. a plant experiment

14. This weed is an example of

A. Purslane
B. Common Chickweed
C. Nut Sedge
D. Field Bindweed

15. This weed is

A. Crabgrass
B. Giant Ragweed
C. Quackgrass
D. Dandelion

16. This picture shows an example of

A. pinking shears
B. loping shears
C. herbascious clippers
D. hedge shears

17. This picture shows an example of

A. Pieris foliage
B. Poinsettia
C. Coleus
D. Pachysandra

18. This material is

A. cheese cloth
B. tarpaulans
C. mulch sheeting
D. burlap

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19. This picture shows an example of

A. an air conditioner
B. a space heater
C. a soil sterilizer
D. an insecticide fogger

20. This tree is

A. a Canadian Hemlock
B. an Eastern Red Cedar
C. a Taxus
D. a White Fur

21. This flower is

A. an Aster
B. a Carnation
C. a Marigold
D. a Sweet William

22. This machine is

A. a rototiller
B. a flail chopper
C. a grass thatcher
D. a cultipacker

23. These flowers are

A. Jonquils
B. Dahlias
C. Tulips
D. Crocus

24. This tool is called

A. a turnbuckle
B. a log roller
C. a load binder
D. a double joint slip hook

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25. This flower is

A. a Gladiola
B. a Dahlia
C. a Mum
D. an Aster

26. This flower is

A. a Carnation
B. a Dahlia
C. an Aster
D. a California Poppy

27. This picture is an example of

A. a portable mulch bed
B. a portable water tank
C. a steam cart
D. a portable herbicide treatment tank

28. This slide is an example of

A. Slender Deutsia
B. Spreading Cotoneaster
C. Flowering Quince
D. Flowering Locust

29. This is an example of

A. European Mountain Ash
B. Green Ash
C. Honeylocust
D. Washington Hawthorn

30. This slide is an example of

A. Common Lilac
B. Littleleaf Linden
C. Katsuratree
D. Eastern Redbud

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31. This slide is an example of

A. Forsythia
B. Golden Chaintree
C. Honeysuckle
D. Chinese Lilac

32. This is an example of

A. Sugar Maple
B. Hedge Maple
C. Red Maple
D. Sweetgum

33. This slide is an example of

A. European Privet
B. Tartarian Honeysuckle
C. Bumalda Spirea
D. Spicebush

34. This is an example of

A. Bridalwreath Spirea
B. Regal Privet
C. Burkwood Virburnum
D. Doublefile Viburnum

35. This is an example of

A. Littleleaf Linden
B. American Elm
C. Hedge Maple
D. Blackhaw Virburnum

36. This is an example of

A. Silver Maple
B. Tuliptree
C. Flowering Quince
D. Flowering Dogwood

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37. This is an example of

A. Silver Maple
B. Green Ash
C. Japanese Tree Lilac
D. Amur Maple

38. This man is using a

A. limb chipper
B. leaf stripper
C. log splitter
D. log sizer

39. This man is using

A. a spray rig
B. a duster
C. a herbicide applicator
D. a fertilizer applicator

40. The flower pictured is

A. a Dahlia
B. an Aster
C. a Carnation
D. a Chrysanthemum

41. This leaf is identified as

A. an American Holly leaf
B. an Oregon Grape-Holly leaf
C. a Crabapple leaf
D. a Japanese Holly leaf

42. This slide shows the fruit of the

A. Winged Elm Tree
B. Tuliptree
C. Silver Maple Tree
D. White Ash Tree

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43. These flowers are called

A. Easter Lilies
B. Morning Glory
C. Carnations
D. Narcissis

END OF TEST

FORM B-2

HORTICULTURE MASTERY TEST

1. A few years after moving into your newly built home, you notice that some of the more mature trees are starting to show undersized and partially yellow leaves. The most likely source of the problem is

    A. too much water
    B. compaction and backfill over the roots of the tree
    C. lack of nutrients
    D. possibly all of these

2. Which of the following trees has heart shaped leaves?

    A. Red Maple
    B. Redbud
    C. Red Oak
    D. Tuliptree

3. The Sentry Maple is best known for its shape which is

    A. globe
    B. vase
    C. columnar
    D. rectangular

4. A recommended shade tree that grows over 50 feet tall is

    A. Redbud
    B. Red Oak
    C. Ruby Red Horsechestnut
    D. None of the above

5. Which of the following has yellowish white flowers?

    A. Washington Hawthorn
    B. Hopa Sargent Crabapple
    C. Kwanzan Cherry
    D. Quince

6. The tissue responsible for stem diameter increases is the

    A. cambium
    B. cortex
    C. pith
    D. phloem

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7. Sequestrene might be used to treat

   A. chloratic Pin Oak
   B. evergreen cuttings
   C. Lilac with powdery mildew
   D. recently pruned trees

8. Soil pasturization is done to

   A. kill weed seeds
   B. kill disease organisms
   C. kill insect eggs
   D. all the above

9. Red spiders on roses are controlled by

   A. malthion
   B. terrachlor
   C. kelthane
   D. lead arsenate

10. Which of the following is a perennial?

    A. Vinca Rosea
    B. Chrysanthemum
    C. Petunia
    D. Zenia

11. Which foliage has the heaviest texture?

    A. Asparagus Fern
    B. Huckleberry
    C. Baker Fern (Leatherleaf Fern)
    D. Salal (Lemonleaf Fern)

12. The underlying skeleton or linear pattern which holds an arrangement together is called

    A. form
    B. line
    C. scale
    D. pattern

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13. The maximum number of colors which should ordinarily be used in a design is

    A. 3
    B. 4
    C. 5
    D. 6

14. Which flower has the best keeping quality?

    A. Rose
    B. Pompom
    C. Stock
    D. Gardenia

15. A soil test indicates whether the soil is

    A. low or high in nutrients
    B. acid or alkaline
    C. both A and B
    D. neither A or B

16. How many pounds of actual nitrogen are contained in a 50 pound bag of 10-6-4 fertilizer?

    A. 6 lbs.
    B. 5 lbs.
    C. 10 lbs.
    D. 50 lbs.

17. When fertilizing shrubs in the spring use 10-6-4 at the ratio of

    A. 3-4 lb. per 100 sq. ft.
    B. 1 lb. per 100 sq. ft.
    C. 8-10 lb. per 100 sq. ft.
    D. any of the above

18. Poison ivy is controlled by applications of

    A. Kelthane
    B. Sevin
    C. Benlate
    D. 2,4-D

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19. Red spiders are controlled chemically by the use of

A. herbicides
B. miticides
C. fungicides
D. antibiotics

20. The pH in soils can be increased from 4.7 to 6.8 by adding

A. sand
B. lime
C. sulfur
D. nitrogen

21. Which soil particle has the greatest ability to hold nutrients?

A. sand
B. silt
C. clay
D. loam

22. In a 50 pound bag of fertilizer having an analysis of 15-10-5, how many pounds of phosphorus are present?

A. 15
B. 10
C. 5
D. 30

23. Which of the following plants might be suggested for a rapidly growing screen?

A. Browns Yew
B. Privet
C. Japanese Pieris
D. Euonymous

24. Each hardwood cutting should include at least

A. 2 nodes
B. 6 nodes
C. 10 nodes
D. nodes are not needed on cuttings

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25. Whip grafting is best done in

A. early fall
B. late summer
C. early summer
D. late winter

26. The stock that is to be cleft grafted should be cut

A. diagonally
B. parallel to last branch
C. squarely
D. at least twice

27. Which of the following plants is mainly propagated by division?

A. Peony
B. Raspberry
C. Azalea
D. Juniper

28. The most common type of graft used in propagating upright Junipers is

A. splice graft
B. side graft
C. cleft graft
D. budding

29. Most crabapple cultivars are propagated by

A. cuttings
B. budding
C. layering
D. B and C

30. A grass used in mixtures for quick temporary cover for erosion control is

A. Common Kentucky Bluegrass
B. Kentucky 31 Tall Fescue
C. Common Ryegrass
D. Creeping Bentgrass

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31. Which of the following grasses would not be included in a mixture for home lawns in Ohio?

A. Common Kentucky Bluegrass
B. Creeping Red Fescue
C. Merion Bluegrass
D. Zoysia

32. In highway hillside plantings a good cover crop is desirable to keep soil from eroding and to beautify the land cut. From the following list, which plant species would be the most desirable?

A. Merion Bluegrass
B. Bentgrasses
C. Annual Bluegrass
D. Crownvetch

33. To prevent water accumulation in a tile line, a drop of

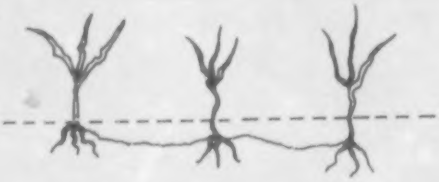
A. 1 to 3 inches per 100 linear feet is required
B. 2 to 4 inches per 100 linear feet is required
C. 3 to 6 inches per 100 linear feet is required
D. 4 to 8 inches per 100 linear feet is required

34. To add a supply of sulfur and calcium to the soil but not significantly change the pH, one would add

A. dolomitic limestone
B. gypsum
C. calacitic limestone
D. flowers of sulfur

35. Identify the method of vegetative reproduction pictured below

A. Tillers
B. Stolons
C. Rhizomes
D. Ligules



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36. The time for seeding lawns in central Ohio which would give the best chance for success is

A. March 15 - April 15
B. September 1 - 30
C. October 15 - November 15
D. January 15 - March 15

37. The amount of Kentucky bluegrass seed needed to seed 1,000 square feet is

A. 1/2 - 2 lbs.
B. 1 - 3 lbs.
C. 5 - 7 lbs.
D. 20 - 30 lbs.

38. Which of the following is an example of a "warm-season" grass?

A. Bluegrass
B. Zoysia
C. Red Fescue
D. Rye

39. When some seeds are planted 2" deep in the soil they are slow to germinate. This is most likely due to

A. not enough light
B. too much water
C. not enough air
D. improper temperature

40. Mulches are used to

A. add nutrients to the soil
B. conserve moisture
C. find a use for waste material
D. decrease the texture

41. The main purpose of aerating a turf is to

A. improve drainage
B. reduce surface compaction of the soil
C. get fertilizer to the plant roots
D. thin the turf

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42. Whenever large amounts of sand and peat are used to alter the physical condition of the soil, it will be necessary to adjust certain maintenance practices which are

A. fertilization and mowing
B. fertilization and spraying for weeds
C. mowing and spraying for weeds
D. fertilization and irrigation

43. A subsoil that has a bright yellowish color generally indicates

A. poor drainage
B. good drainage
C. good fertility
D. poor fertility

44. Shrubs which are not intended to become a hedge should be spaced at planting

A. no closer than one-half their mature spread
B. no closer than their mature spread
C. one foot for each inch of trunk diameter
D. so that their longest branches just touch

45. Phosphorus is essential for

A. chlorophyll formation
B. root development
C. enzyme activation
D. healthy bark

46. Sand and peat are mixed into soils used on golf greens and tees to

A. provide nutrients
B. build resilience and resist compaction
C. promote deep rooting and provide nutrients
D. promote deep rooting and neutralize acidity

47. The best pH range for most turfgrasses is

A. 5.5 to 6.0
B. 6.0 to 6.5
C. 6.5 to 7.0
D. 7.0 to 7.5

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48. A term used to designate the minimum guaranteed percentages of nitrogen, available phosphate, and water soluble potash contained in a fertilizer is a

A. nutrient level
B formula
C. grade
D fertilizer analysis

49. Finely ground limestone

A. helps reduce acidity more rapidly than coarsely ground limestone
B is more effective as a fungicide than coarsely ground
C. is more effective in reducing the acidity of the subsoil
D is less expensive than agricultural grade limestone

50. Basic fertilizer for turfgrass establishment consists of

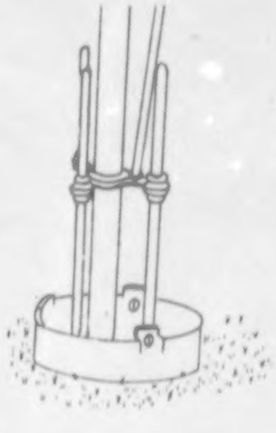
A. phosphate materials
B. potash materials
C. phosphate and/or potash materials
D nitrogen and potash materials

51. The fertilizing element least likely to be lacking in lawns is

A. nitrogen
B. potassium
C. phosphorus
D. sulfur

52. This turfgrass worker is using this tool to

A. take a soil sample
B run a perculation test
C. test the moisture content
D. install a new cup



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53. Vertical mowing is a cultural practice designed to

A. correct the development of grain and thatch
B. correct the effects of over-fertilization
C. improve the putting condition of a golf green
D. control chinch bugs

54. "Grain" is a term used to describe a turf condition caused by

A. using a dull mower
B. operating a mower too fast
C. continued mowing in the same direction
D. improper application of fertilizer

55. Infiltration rate of water refers to the rate at which water moves

A. into the soil
B. through the soil
C. into the grass
D. through the grass

56. The best time to control crabgrass in lawns is

A. spring
B. summer
C. fall
D. winter

57. Dandelion is a common perennial weed which is best controlled by

A. 2,4-D
B. 2,4,5-T
C. Sevin
D. diazinon

58. Mildew on lawns is caused by a

A. fungus
B. bacteria
C. rust
D. scale

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59. Newly planted trees and shrubs should be watered twice a weed during hot weather unless

A. there is at least 1/4 inch of rainfall per week
B. there is relatively high humidity
C. the soil is covered with 4 inches of mulch
D. there is at least one inch of rainfall per 7 to 10 days

60. Which of the following is not a reason for wrapping the trunks of newly transplanted trees

A. reduces water loss
B. protects from sun scald
C. partial protection against borers
D. partial protection against certain aphids and mites

61. Bark injuries to trees should be repaired by

A. removing damaged bark and shaping the wound so that it is pointed at the top and bottom
B. removing loose bark and shaping the wound into a circle
C. making a bridge graft over the damaged spot
D, both b and c above

62. If you should accidentally spill some pesticide concentrate on yourself, you should immediately

A. consult the label to see if an antidote is suggested
B. remove contaminated clothing and wash thoroughly
C. telephone a doctor for instructions
D. contact the local Poison Control Center

63. The first step in preparing to use a pesticide is to

A. put on your rubber gloves and respirator
B. clean the spray tank with hot soapy water
C. read the pesticide label
D. make sure the sprayer nozzles are not clogged

64. Pesticides should be stored

A. in their original containers only
B. in a cool, dry place where they will not freeze
C. in a building or cabinet which is always locked
D. all of the above

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65. A flight of outdoor steps should

A. have a wide tread and low risers
B. be no higher than it is wide
C. be narrow and direct
D. both a and b above

66. A walk to the front door should

A. be wide enough for two people to walk side-by-side
B. be as close to the house as possible
C. lead directly to the front door from the street
D. both a and c above

67. Flower beds are undesirable in the public area because they

A. contrast too sharply with the house
B. compete with the house for attention
C. contrast too sharply with the dull colors of walks and driveways
D. require excessive maintenance and attract insects

68. The best over-all planting for the public area should be

A. mostly deciduous plants that are hardy in the area
B. mostly evergreens because they stay green in the winter
C. either all evergreen or all deciduous
D. a combination of broadleaf evergreens, needle evergreens, and deciduous shrubs

69. When selecting for privacy in the patio area a recommended practice is to

A. construct several screens or baffles close to the patio
B. plant a Rosa multiflora hedge along the property line
C. construct a dry wall along the property line
D. plant a dense screen of Cotoneaster apiculata around the patio or along the property line

70. When landscaping, contrast is

A. used to call attention to a feature of the landscape
B. achieved by grouping together plants of different texture, size, habit, or color
C. both a and b above
D. none of the above

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71. If a soil test indicates that corrective fertilizer of analysis 0-46-0 should be applied at the rate of 12 lbs./1000 sq. ft., how much available phosphorus (P_2O_5) is being added per 1000 sq. ft.?

A. 5.5 lbs.
B. 6.5 lbs.
C. 12 lbs.
D. Not enough information is given

72. Antidesiccants or antitranspirants are used to

A. keep roots from drying out during shipping
B. reduce moisture loss from leaves
C. slow down respiration in storage tissue
D. control scale insects

73. In order to harden-off plants before transplanting they are

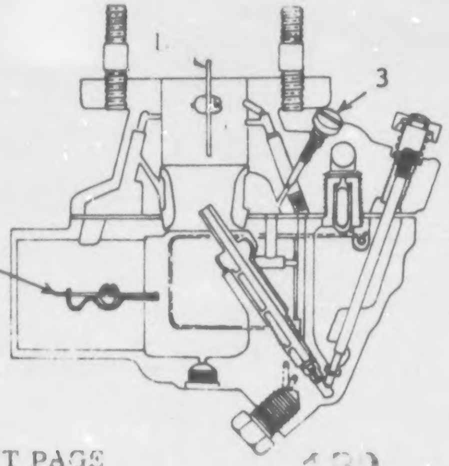
A. gradually kept cooler and drier
B. gradually kept cooler and given extra nitrogen
C. given less light and less nitrogen
D. given more light and more water

74. Heavy soils of clay and light soils of sand are often modified before transplanting nursery stock. The soil modification enables

A. light soils to absorb water more rapidly
B. heavy soils to hold more nutrients
C. heavy soils to provide better aeration
D light soils to be more porous

75. From this diagram of the cross section of a carburetor, number 2 is called the

A. choke plate
B. main mixing chamber
C. float bowl
D. throttle plate



76. From this same diagram (question 75) number 3 is used to adjust

A. idle speed
B. idle gas-air ratio
C. the main gas-air ratio
D float level

END OF TEST

FORM A-3

HORTICULTURE MASTERY TEST

1. Chlorosis or yellowing of leaves in Pin Oaks, Maples, and Azaleas is a deficiency of

A. chlorine
B. iron
C. water
D. nitrogen

2. Which of the following is not an essential element for plant growth?

A. Copper
B. Iodine
C. Zinc
D. Nitrogen

3. The leaves of maple trees are

A. opposite
B. alternate
C. whorled
D. entire

4. The recommended pruning time for early spring flowering deciduous shrubs is

A. late winter
B. before flowering in spring
C. after flowering in spring
D. early fall

5. The leaves of most dogwoods are

A. opposite
B. alternate
C. whorled
D. A and C

6. Which is most commonly used as a source of foliage for making flower arrangements?

A. Maidenhair Fern
B. English Ivy
C. Boxwood
D. Salal (Lemonleaf)

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7. Which of the following would not lower pH?

   A. Superphosphate
   B. Aluminum sulfate
   C. Sulfur
   D. Iron sulfate

8. Apple scab on crabapple trees is caused by

   A. fungus
   B. virus
   C. bacteria
   D. germ

9. Scale insects are best controlled by

   A. dormant oil
   B. 2,4-D
   C. kelthane
   D. 2,4,5-T

10. Which of the following plants require the least amount of maintenance?

    A. Viburnum, Mugho Pine, Brown Yew
    B. Privet hedge, lilac, White Pine
    C. Kalls Honeysuckle, Silver Maple, Spirea
    D. Weeping Willow, Crabapple, wigelia

11. The transfer of pollen from stamen to pistil is known as

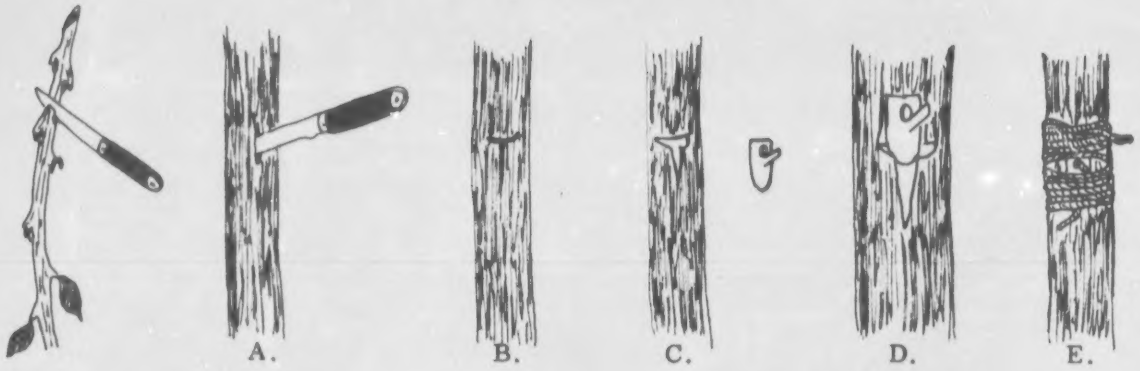
    A. germination
    B. pollination
    C. fertilization
    D. none of the above

12. Bagworms, a serious pest problem in arborvitae, are commonly controlled with sprays of

    A. sevin
    B. aramite
    C. benlate
    D. all the above

GO TO NEXT PAGE

This sequence of drawings will be used to answer questions 13 through 15.



13. This procedure or operation is called

   A. terminal stem grafting
   B. cleft grafting
   C. bud grafting
   D. none of the above

14. The "T" cut made in Figure B should be cut

   A. halfway through the bark layer so as to expose the cambium
   B. only through the bark to expose the wood
   C. through the bark and one layer of inner wood
   D. at any depth depending on convenience

15. In the final stage the graft is wrapped to

   A. keep the sun off
   B. keep it moist
   C. hold the graft in place
   D. both B and C

16. Which one of the following grass varieties would not be included in a mix for athletic fields?

   A. Common Kentucky Bluegrass
   B. Merion Kentucky Bluegrass
   C. Bentgrass
   D. Tall Fescue

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17. The pH of the soil refers to

A. the degree of acidity of the soil
B. the concentration of hydrogen ions in the soil solution
C. the soil contains equal proportions of (H+) and (OH+)
D. the amount of calcium and sulfur the soil contains

18. Sphagnum moss peat is an organic material especially recommended as a soil physical conditioner because it

A. decomposes slowly
B. is easily incorporated
C. is not very costly
D. is readily available

19. The main difference between rhizome and stolon methods of reproduction is

A. rhizomes are above ground while stolons are below ground
B. rhizomes are below ground while stolons are above ground
C. rhizomes are angiosperms; stolons are not
D. stolons are angiosperms; rhizomes are not

20. Most **Merion** Bluegrass turfgrasses are mowed to a height of

A. 1 to 1½ inches
B. 1½ to 2 inches
C. 2 to 2½ inches
D. 2½ to 3 inches

21. During the growing season the homeowner is burdened with the chore of lawn mowing. He normally selects the rotary mower for this purpose. The reason he does so is because of

A. their scissors-like cutting action
B. their superior safety features
C. their flat top cutting of the lawn and superior cutting action on poorly growing grass areas and lawn weeds
D. all of the above

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22. The amount of water that should be applied to a turf is determined by the

    A. number of days since the last watering
    B. amount of moisture desired in the soil
    C. type of grass species found in the turf
    D. time of day and temperature

23. When cleaning and servicing small engine air cleaners which of the following should not be cleaned in solvent?

    A. Dry type air cleaner
    B. Oil foam air cleaner
    C. Oil bath air cleaner
    D. All of the above

24. When handling balled plants you must be careful to handle them

    A. by the stem
    B. by grasping the branches
    C. by grasping the ball itself
    D. by placing chain around trunk and lifting with a hoist

25. When guying a newly transplanted tree, the stake at the base of the guy wire should be driven into the ground

    A. at the same angle as the guy wire
    B. perpendicular to the guy wire
    C. at a 30^{o} angle to the guy wire
    D. at a 60^{o} angle to the guy wire

26. Regular pruning of mature deciduous shrubs could best be described as

    A. cutting back
    B. shearing
    C. rejuvenation
    D. thinning out

27. Which of the following is not a basic goal of modern landscaping in the public area?

    A. Soften architectural lines of the building
    B. Frame the building with trees
    C. Maintain open lawn areas
    D. Hide the foundation of the building

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28. The most important feature in the public area is

A. the birdbath
B. the front entrance
C. the picture window
D. the flower bed or specimen tree

29. When landscaping, unity can be achieved by

A. using the same screening materials as the neighbors
B. developing asymmetrical balance around a focal point
C. tying plantings together with a living groundcover
D. using a variety of plants throughout the landscape

30. When planting a bare root plant, which one of the following is not recommended?

A. Prune dead and broken roots away
B. Spread roots around in planting hole
C. Stamp around plant to secure the soil
D. Gently raise and lower the plant to settle the soil

31. The major cause of plant loss during the first growing season is

A. lack of sufficient water
B. lack of sufficient nutrients
C. insect infestation due to weak condition of plant
D. improper planting depth

32. A planting media is in need of a soil conditioner if

A. it drains too rapidly
B. it drains too slowly
C. it is very compacted and hard
D. all of the above

33. When propagating greenhouse plants from seed one should

A. sow the seed lightly in rows
B. broadcast seed over the whole seedling plant
C. sow seed heavily in rows
D. none of the above

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34. One important method of reproducing Easter Lilies is

A. separation of the individual scales and planting them
B. cutting the bulb in half and planting each half
C. planting all bulblets that occur
D. none of the above

35. When a Chrysanthemum plant is pinched it results in

A. reduced quality
B. increased quantity of flowers
C. increased size of plant
D. reduced quantity of flowers

36. In order to set flower buds in tulips

A. a cold period is needed
B. a warm period is needed
C. a dry period is needed
D. a warm, dry period is needed

37. One of the most popular spike flowers used in floral design is

A. Pom Pom
B. Gladiolus
C. Babys Breath
D. Aster

38. The least important environmental factor concerning plant growth is

A. water
B. temperature
C. containers
D. nutrients

39. A common spacing for pom pom Chrysanthemums is

A. 2 x 3 inches
B. 2 x 5 inches
C. 6 x 7 inches
D. 6 x 3 inches

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40. Which of the following bulbs is very poisonous if eaten?

A. Tulip
B. Hyacinth
C. Narcissus
D. Easter Lily

END OF TEST

FORM B-3

HORTICULTURE MASTERY TEST

1. New fertilizers are appearing on the market everyday. A product where the nutrients are released over a period of nine months is

    A. ammoniated nitrogen
    B. urea nitrogen
    [illegible] osmocote
    D. nitrate nitrogen

2. In order to rejuvenate leggy deciduous shrubs

    A. cut all stems back one-half
    B. thin out one-third to one-half of the stems at ground level
    C. remove tips of all stems
    D. all of the above

3. In the name Malus Purpurea Lemoinei, the word "Lemoinei" is referred to as the

    A. family
    B. cultivar
    C. genus
    D. species

4. A mixture of 90% sphagnum moss and 10% clean sand is a correct mixture for a rooting media.

    A. True
    B. False

5. Soil structure refers to the

    A. type of soil particle
    B. arrangement of particles in the soil
    C. weight of particles in the soil
    D. size of soil particles

6. Seedlings which are to be "hardened off" should be

    A. gradually cooled and watered less
    B. put in a dark cool area
    C. fertilized heavily
    D. kept warm and moist

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7. The basal cut of softwood shoots is generally made

   A. just above a bud or leaf
   B. just below a bud or leaf
   C. between a bud and a leaf
   D. anywhere is OK

8. Most perennials are propagated by

   A. division
   B. layering
   C. cuttage
   D. grafting

9. A group of plants propagated vegetatively from a single individual is known as a

   A. species
   B. genus
   C. clone
   D. family

10. A bud graft should be done in

    A. summer
    B. winter
    C. fall
    D. any of the above

11. Which grass is often included in lawn seed mixtures because it quickly provides a temporary ground cover?

    A. Annual Bluegrass
    B. Kentucky Bluegrass
    C. Common Ryegrass
    D. Creeping Red Fescue

12. A grass most suitable for shady conditions is

    A. Kentucky Bluegrass
    B. Bentgrass
    C. Fescue
    D. Rye

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13. Which soil particle has the lowest nutrient holding capacity?

A. Sand
B. Silt
C. Clay
D. Organic matter

14. Mulching with clean straw

A. covers the seed
B. prevents wind erosion
C. protects against excessive moisture evaporation
D. prevents washing of seeds during rains

15. What is the element that should be incorporated into the soil prior to seeding it for a lawn?

A. Nitrogen (N)
B. Phosphorus (P)
C. Potassium (K)
D. Iron (Fe)

16. It is advised to fertilize the lawn frequently throughout the season. The element that is in constant short supply and is the major reason for repeated fertilization is

A. Nitrogen (N)
B. Phosphorus (P)
C. Potassium (K)
D. Iron (Fe)

17. The use of lime on a soil to correct acidity also

A. helps to improve drainage
B. makes fertilizer nutrients available
C. controls grubs in the soil
D. prevents fertilizer burn

18. The release of nitrogen from slowly available fertilizers depends partly on temperature and the

A. amount of moisture in the soil
B. type of crop being grown
C. activity of soil micro-organisms
D. soil pH (acidity)

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19. The form of lime recommended for use on turfgrass areas is

A. ground limestone
B. burned lime (calcium oxide)
C. hydrated lime (calcium hydrate)
D. marl

20. A soil returned from the soil testing laboratory with a pH of 9.0 is

A. neutral
B. intensely acid
C. strongly alkaline
D. slightly alkaline

21. The most common mowing height for bluegrass tees is

A. 1/2 of an inch
B. 1 inch
C. 1 1/4 inches
D. 2 inches

22. The grass most likely to survive and grow well under close clipping is

A. Red Fescue
B. Bentgrass
C. Kentucky Bluegrass
D. Ryegrass

23. A light application of water is used to correct "temporary wilt" on golf greens. This practice is called

A. syringing
B. sprinkling
C. wetting
D. damping-off

24. Several insects may damage turfgrasses. The grayish-white, fleshy, worm-like pests which feed on the below ground parts of the grass plants are called

A. sod webworms
B. nematodes
C. chinch bug larvae
D. grubs

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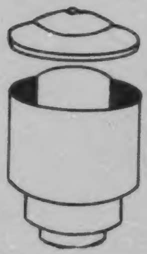
25. Grubs in turf are controlled by spraying with

A. chlordane
B. malathion
C. benlate
D. 2,4-D

26. This is one type of air cleaner that is used on small engines that power equipment used in horticulture. It is called a

A. dry type air cleaner
B. oil foam air cleaner
C. oil bath air cleaner
D. ceramic filter air cleaner



27. If you cannot plant bare root plants soon after purchase, you should

A. heel them in temporarily
B. just dispose of them
C. return them to the nursery
D. keep them covered with warm water

28. Deciduous shrubs should be transplanted by the bare-root method only

A. immediately after flowering
B. if they have been root-pruned within a year before transplanting
C. if they are in the dormant state
D. in late May or early June

29. A deciduous hedge should be trimmed

A. so that its sides are vertical
B. so that it is broader at the base than at the top
C. in early winter
D. in late fall

30. Empty pesticide containers should be

A. sent to the local dump or incinerator
B. thoroughly cleaned and recycled
C. saved for future use
D. buried or burned away from people and animals

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31. A specimen plant is

A. used to accent a group shrub planting
B. used on either side of the front door
C. intended to be viewed as an individual
D. the plant around which all others must be balanced

32. When selecting plants for the landscape plan you should consider

A. their mature height and spread
B. their foliage, fruit, flowers, and habit
C. their soil and exposure requirements and hardiness
D. all of the above

33. By arranging groups of plants with low plants in the foreground, medium-sized plants behind them, and taller plants in the background, we are using the principle of

A. scale
B. sequence
C. repetition
D. proportion

34. So that the driveway can easily be seen it should be marked by

A. several bright reflectors
B. brightly painted rocks
C. A or B above
D. none of the above; it is not necessary to mark the driveway

35. A fence that is built for privacy should be

A. simple and functional
B. of the chain-link type since they are more durable
C. fancy and decorative
D. at least as high as the eaves of the house

36. Wrapping at the trunk of a newly planted tree helps prevent

A. sunscald
B. drying of the bark
C. reduces possibility of borer infestation
D. all of the above

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37. Trees and shrubs planted in early spring (March or early April)

    A. should be mulched 1" - 2"
    B. should be mulched 4" - 6"
    C. should not be mulched to allow the soil to warm up
    D. should not be mulched to allow water to enter the soil more freely

38. Before adding micronutrients to a planting media, one should

    A. make sure all micronutrients are added to the media
    B. make a thorough analysis of the planting media for nutrient content
    C. add only the most common micronutrients
    D. they are not important, don't add any

39. When using a liquid fertilizer applicator in the greenhouse, it is best to

    A. fertilize heavily once a week
    B. fertilize lightly every watering
    C. fertilize heavily once every two weeks
    D. fertilize lightly now and then

40. Stratification of seed is

    A. an important greenhouse technique for germinating seeds
    B. a method of layering soil types
    C. not very important for germinating greenhouse seeds
    D. used on petunias primarily

41. Of the following plants the one that cannot be propagated by a leaf cutting is

    A. African Violet
    B. Gloxinia
    C. Poinsettia
    D. Rex Begonia

42. Shading compound for greenhouses is used to

    A. reduce humidity
    B. change light quality
    C. increase humidity
    D. reduce light intensity

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43. When pasteurizing soil a temperature of 180°F is needed for

A. one hour
B. two hours
C. one and one-half hours
D. one-half hour

44. The best grade of standard Chrysanthemum is

A. Red grade
B. White grade
C. Blue grade
D. Green grade

45. The individual flowers on a snapdragon spike are called

A. Anthers
B. Pistils
C. Florets
D. Stamens

46. Plants which are sensitive to light are said to have a

A. geotropic response
B. hydrotropic response
C. thigmotropic response
D. phototropic response

47. The most common proportion of fertilizer to water for a siphon mixer is

A. 1 to 8
B. 1 to 16
C. 1 to 32
D. 1 to 64

48. One method to reduce soluble salt build-up is to

A. run the crop dry
B. leach the crop
C. add lime
D. increase fertilizer amounts

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49. The least important method of insect and disease control in the home landscape should be

A. use of resistant varieties
B. removal of dead and diseased branches
C. keeping plants watered, fertilized, and vigorous
D. chemical applications

50. All of the following are used to break dormancy in seeds except

A. scarification
B. hot water
C. Captan
D. stratification

51. A Rock Cotoneaster "on a standard" is

A. a container plant graded by ANA standards
B. a group of one hundred plants sold as a unit
C. a three year old pinched plant bearing fruit
D. a miniature tree form produced by grafting high on to a compatible rootstock

52. Which of the following is not true concerning grafting as a method of propagation?

A. Grafting is used to propagate varieties which cannot be conveniently propagated by other methods.
B. Grafting is used to change the variety on an established plant (tap working).
C. Grafting is used because it is easier and less expensive than cuttings.
D. Grafting is used to utilize benefits from certain rootstocks.

53. An espalier is

A. a plant trained to basically two dimensions
B. a plant trained to an unusual three dimensional shape
C. a plant limbed up very high
D. a plant which has been double grafted

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54. Baltic Ivy, Vardar Valley Common Boxwood, and Laland Firethorn are all clones selected for their

A. disease resistance
B. winter hardiness
C. fall color
D. shade tolerance

55. Broadleaved evergreens are usually propagated from

A. herbaceous cuttings
B. softwood cuttings
C. semi-hardwood cuttings
D. hardwood cuttings

56. Girdling may occur when

A. plant roots are pruned too drastically
B. plastic or wire-attached labels are not removed
C. tree wrap is applied too tightly
D. pruning scars are not treated

57. Which of the following is a narrowleaved evergreen shrub?

A. Scotch Pine
B. Canadian Hemlock
C. Mugho Pine
D. Concolor Fir

58. Which of the following needs a well drained, acid soil high in organic matter?

A. Upright Japanese Yew
B. Blue Rug Juniper
C. Evergreen Azalea
D. Eastern Redbud

59. Which of the following is a small deciduous shrub?

A. Japanese Pieris
B. Purple Wintercreeper Euonymus
C. Convexleaf Japanese Holly
D. Cranberry Cotoneaster

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60. For which group of plants is it generally most important to consider orientation (compass direction) and exposure relative to other landscape features?

A. Broadleaf evergreens
B. Narrowleaf evergreens
C. Deciduous shrubs
D. Fall flowering trees

61. Which of the following is particularly sensitive to poor drainage?

A. Red Maple
B. Taxus
C. Thornless Honeylocust
D. Cotoneaster

62. "Removing half the candle" is

A. a method of pruning pines
B. a method of pruning junipers
C. a means of hardening off bedding plants
D. a technique of budding

63. From a distance of eight or ten feet which of the following would be most easily confused?

A. Boxwood and Japanese Holly
B. Japanese Holly and American Holly
C. American Holly and Oregon Grape Holly
D. Japanese Pieris and Boxwood

64. Caliper refers to

A. the grade of a bare-root shrub according to weight
B. the diameter of a tree
C. the setting on a fertilizer applicator
D. a device used to root prune trees and shrubs

65. Which of the following cannot be used as a ground cover?

A. Blue Rug Juniper
B. Vinca
C. Pachysandra
D. Winged Euonymus

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66. Sequestrene is

A. a rooting compound for use on cuttings
B. an iron chelate for iron-chlorotic plants
C. a chemical pruning agent
D. a wetting agent used in chemical solutions

67. Organic fertilizers are probably most desirable because they

A. are less expensive than synthetics
B. are slowly available and non-burning
C. come in higher analyses
D. dissolve more readily

68. When we have cloudy winter weather in Ohio which of the following is true for a mum crop?

A. Daytime temperature should be raised to 65-70°F
B. Additional lighting should be provided
C. Watering should be less frequent and carefully done
D. Nitrogen fertilizer should be applied only every three weeks

69. Which of the following is least important to pre-emergence herbicide effectiveness?

A. Soil type
B. Soil cultivation practices
C. Soil moisture
D. Soil phosphorus level

70. Chloro-IPC, Casoron, Simazine, and Treflan are all

A. post-emergence herbicides
B. soil fumigants
C. pre-emergence herbicides
D. fungicides

71. Gladiolus must be shipped

A. at an angle
B. vertically
C. horizontally
D. it makes no difference how they are shipped

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72. Which of the following is not necessary information in a good weed control program?

A. Species of nursery plants
B. Species of weeds present
C. Current weed control recommendations from county extension agent
D. DIIK

73. Post-emergence herbicides are used most effectively in the nursery or landscape in

A. tree or large shrub areas
B. ground cover areas
C. narrowleaf evergreen areas
D. broadleaf evergreen areas

74. Which of the following statements about soil sampling is incorrect?

A. Sample when soil moisture conditions are suitable for plowing.
B. Remove sod or top debris before sampling
C. Sample lawn areas to a three to six inch depth
D. Slowly oven-dry samples before crushing and mixing

75. Which of the following would not be transplanted bare-root?

A. Red Maple
B. Japanese Pieris
C. Chinese Lilac
D. Forsythia

76. A B&B broadleaf evergreen would best be transplanted in

A. early fall
B. late winter
C. late fall
D. spring

END OF TEST

APPENDIX E

OBJECTIVES

AGRICULTURAL SUPPLIES/SERVICES
(AGRIBUSINESS SUPPLIES AND SERVICES)

OBJECTIVES
AGRICULTURAL SUPPLIES/SERVICES
(AGRIBUSINESS SUPPLIES AND SERVICES)

A. Human Relations in Agricultural Supplies

1. When meeting with employers, fellow employees, supervisors, or customers, the student will be able to communicate orally or in writing with these person (s) to the satisfaction of the teacher and/or employer.

2. While working in an agricultural supply firm, the student will attempt to improve his relations with other personnel as evaluated by the employer utilizing criteria such as appearance, punctuality, dependability, production, initiative, and cooperation.

3. While employed in the agricultural supply firm, the student will be able to properly answer and use the telephone to conduct business transactions to the satisfaction of the teacher and/or employer.

4. In preparing for an occupation in the agricultural supply firm, the student will be able to conduct a self-evaluation to the satisfaction of the teacher, of his physical appearance, speech and conversation, and personality as it relates to relations with other persons.

Test Items

Form A, Items 24, 25, 26, 27, 28
Form B, Items 23, 24, 25, 26, 27, 28
Form C, Items 23, 24, 25, 26, 27, 28

B. Agricultural Supplies, Salesmanship and Selling

1. While working in the sales department, the student will be able to handle the objections and complaints of a customer to the satisfaction of the teacher and/or employer.

2. While working in the sales department, the student will be able to fill out the appropriate sales forms used by the business to the satisfaction of the employer.

3. While working in the sales department, the student will be able to advertise and display items for sale in a manner acceptable to the teacher and/or employer.

4. While working in the sales department, the student will be able to meet prospective customers and conduct a sales presentation to the satisfaction of the teacher and/or employer.

Test Items

Form A, Items 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20
Form B, Items 1, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 20
Form C, Items 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22

C. Advertising and Promotion

1. The student will be able to write a brief paragraph on the purpose of advertising.

2. The student will be able to determine the cost of advertising through a given media when given a specific situation.

3. The student will be able to identify what is good advertising for each media when given samples of advertising material.

4. The student will be able to construct an advertising calendar as given in lecture.

5. The student will be able to develop a budget from the calendar when given a product and a given amount of money for advertising.

Test Items

Form A, Items 1, 2, 3, 4, 5, 6, 7, 15
Form B, Items 2, 3, 4, 5, 15, 16, 19
Form C, Items 1, 2, 3, 4, 5, 6, 7, 15

D. Agricultural Supply Procedures and Records

1. Upon making a sale, the student will be able to correctly write up a sales ticket and calculate the total cost of the sale after considering and calculating discounts, service charges, and sales tax where applicable.

2. Presented a completed sales ticket and payment in either the form of currency or check, the student will be able to operate the cash register correctly and make change for the customer.

3. Using the appropriate inventory forms used by the agricultural supply firm, the student will be able to correctly maintain a perpetual inventory and take a physical inventory at the end of the year.

4. Using the appropriate purchase order forms and receiving records used by the firm, the student will correctly write up the purchase order for inventory items and complete the receiving records.

Test Items

Form A, Items 23, 39, 46, 47, 48, 49, 50
Form B, Items 22, 39, 40, 44, 45, 46, 47
Form C, Items 39, 40, 41, 47, 48, 49, 50

E. Business Money Management

1. The student will be able to compute business income tax when given a specified business situation, the business books, income tax forms, and references.

2. The student will be able to compute the personal income tax for the proprietor when given personal data.

3. The student will be able to compute local and state tax in accordance with given manuals.

4. The student will be able to identify and list items that are taxable personal property from a list of fifty common household items.

5. The student will be able to provide by type an amount of insurance he would recommend for the enterprise when given the inventory list, number of employees, and owner/manager. The acceptable recommendations are to be within 20% of an actual cost for insurance of the given types within the local area.

6. The student will be able to calculate the annual interest charges by percentage and actual amount when given a case situation relating to (a) credit card charges, (b) commercial bank rates, (c) real estate rates, or (d) truth in lending regulations.

7. The student will be able to draft net worth and financial statements when given a set of books from a small agribusiness.

8. The student will be able to list the conditions under which a bank extends credit for (a) real estate, (b) personal, and (c) commercial uses.

9. The student will be able to determine what is an acceptable sale when given a company credit policy and selected sales slips stating the conditions of sale.

Test Items

Form A, Items 17, 37, 38, 40, 41, 42, 43, 44, 45
Form B, Items 18, 37, 38, 41, 42, 43, 48, 49, 50
Form C, Items 17, 36, 37, 38, 42, 43, 44, 45, 46

F. Marketing Agricultural Products

1. To develop the student's ability and skills necessary to identify the steps involved in marketing agricultural products from the point of production to the ultimate consumer.

Test Items

Form A, Items 21, 22, 29, 30, 31, 32, 33, 34, 35, 36
Form B, Items 21, 29, 30, 31, 32, 33, 34, 35, 36
Form C, Items 21, 29, 30, 31, 32, 33, 34, 35

APPENDIX F

MASTERY TESTS

AGRICULTURAL SUPPLIES/SERVICES (AGRIBUSINESS SUPPLIES AND SERVICES)

FORM A

AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TEST

1. It costs $2.20 per column inch to place an ad in the Classified Section of the newspaper. How much would a classified ad of 3 column inches cost?

   A. $2.20
   B. $4.40
   C. $6.60
   D. $8.80

2. How much would a 1-minute announcement 3 times a day for a week cost if the costs of advertising at the local radio station are as follows

   20-second spot - $3.75
   1-minute - $4.50
   1/2 hour - $30.50

   A. $ 89.50
   B. $100.50
   C. $ 92.50
   D. $ 94.50

3. The costs for advertising on the local TV station are as follows

	60 seconds	30 seconds	20 seconds	10 seconds
Spot buys:	4:00 p.m. to 8:00 p.m.			
Class A	$15.00	$12.00	$9.00	$6.00
	8:00 p.m. to sign-off			
Class B	$12.00	$ 9.00	$6.00	$3.00
	Sign-on to 4:00 p.m.			
Class C	$10.00	$ 8.00	$4.00	$2.00

   Minimum order: 10 spots

   Using this information a 10-second spot at 7:00 p.m. and 10:00 p.m. for 7 days would cost

   A. $84.00
   B. $72.00
   C. $63.00
   D. $42.00

4. The purpose (s) served by an advertising calendar is (are)

   A. it allocates the ad budget
   B. it directs the ad emphasis
   C. it is used as a guide for other marketing efforts
   D. all of the above

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5. As an employee of an agribusiness firm you may be asked to make an advertisement. In making the advertisement you should be aware of the elements of good advertising copy. Which of the following is not one of these elements?

A. Logatype
B. Illustration
C. Color
D. Headline

6. In developing an advertising calendar, which of the following products would you not schedule advertising for the month of January?

A. Winter feed additive
B. Spittle bug spray
C. Silage preservative
D. Seed oats

7. Which of the following products would an Agriculture Supply Store advertise during the month of August?

A. Seed oats
B. Seed wheat
C. Early order fertilizer
D. Atrazine

8. A customer asks for an item or product that is not in stock or is on back order. When confronted with this situation a good salesperson will

A. tell the customer to go to another store
B. call another store to see if the item is available
C. attempt to make a substitute sale
D. any of the above

9. If a customer says "This shovel is too heavy," a salesperson should

A. emphasize service
B. show similar items of different price ranges
C. admit to the objection but show other features
D. show other shovels

10. Which of the following should you be able to do as a machinery salesperson in an agricultural machinery business?

A. Write up a purchase agreement
B. Explain the operation of a combine
C. Suggest maintenance procedures for a corn picker
D. All of the above

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11. A successful salesperson must have

    A. a knowledge of the products he is selling
    B. knowledge of the customers
    C. personal confidence
    D. all of the above

12. When selling a product in an agricultural business, "approach to the sale" means

    A. walking toward the customer
    B. deciding when the customer is ready to buy
    C. making it easy for the customer to buy
    D. all of the above

13. Which of the following indicates to the salesperson that a customer is ready to buy?

    A. Customer asks the salesman to repeat the advantages of the product
    B. Customer shows interest in the product
    C. Customer asks questions about the product
    D. All of these could indicate the customer is ready to buy

14. What is meant by overselling?

    A. Give the customer a little more of the product than he paid for
    B. Continue to talk about product after the customer has decided to buy
    C. Selling the customer two items when he wants only one
    D. Charging more than the original price of the product

15. Which of the following is the most important concern in window display?

    A. To bring customers into the business
    B. To show customers how to use products
    C. To make use of surplus items
    D. To display items to be donated to the Salvation Army

16. Which of the following are not functions of marketing?

    A. Assembling or buying
    B. Processing and packaging
    C. Selling
    D. Production of products

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17. Which of the following is the most important reason for keeping complete and accurate records?

A. To know the financial status of the business at any given time
B. To prepare state and federal tax returns
C. To plan desirable changes in management and operation
D. All of the above

18. A good sales person should know that there are times when a customer's objection must be accepted and forget about the sale.

A. True
B. False

19. Customers should be allowed to handle products so that the sense of touch is involved.

A. True
B. False

20. If a customer wants to know price first and other information later, reversing this order will lose the customer's attention.

A. True
B. False

21. As an employee of a grain elevator you are asked "Why are storage fees so great? All you do is hold our grain." Which of the following is not a factor in determining the cost of storage?

A. Shrinkage
B. Insurance
C. Labor
D. All of the above are cost factors

22. The receipt for stored grain given to a farmer by a storing warehouse is called

A. a storage receipt
B. an inventory receipt
C. a promisory receipt
D. a warehouse receipt

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23. An advantage of production contracts or leases over outright purchase or ownership is

    A. farmers can operate at peak efficiency
    B. market supply is approximately equal to market demand
    C. financial risks are shared by two or more parties
    D. farmers become more independent

24. In business, human relations means

    A. relationships between the employer and employees
    B. relationships between employees
    C. relationships between customers and salespersons
    D. all of these

25. The persons in managerial positions in an agricultural business are responsible for

    A. production
    B. sales
    C. service
    D. all of the above

26. The reactions of the people in a company toward each other may be interwoven into what is called

    A. company morale
    B. success
    C. failure
    D. advancement or promotion

27. Employers evaluate the personal qualities of potential employees by

    A. reviewing the application form
    B. interviewing the person applying for a job
    C. checking references provided by a job applicant
    D. all of the above

28. Misinformation is often passed from one employee to another in the form of

    A. good intentions
    B. semantics
    C. rumors
    D. oral communication

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29. "Assembly" as a marketing function is the same as

A. processing
B. grading
C. buying
D. storing

30. "Processing" as a marketing function is

A. putting the product in a salable container
B. maintaining productivity in a facility
C. gathering a product at a convenient place
D. changing the form of the product to meet consumer demands

31. The main reason for the management of an agricultural business to study market channels is to

A. reduce damage to products
B. reduce transporta[illegible]st
C. reduce the number of handlers
D. reduce the number of final outlets

32. Market lambs dress out at approximately

A. 40% of live weight
B. 50% of live weight
C. 60% of live weight
D. 75% of live weight

33. "Cash grain" market quotations refer to

A. price for grain delivered to local markets
B. price for grain delivered to Columbus, Ohio
C. price for grain delivered to Chicago, Illinois
D. price for grain delivered to New York

34. The main purpose of the futures market is to

A. establish a firm price
B. establish a competitive market
C. establish year around grain markets
D. establish equal prices

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35. Which of the following is not considered when establishing railroad freight rates?

A. Space required for the load
B. Weight of the load
C. Distance to be traveled
D. Value of the load

36. Parcel service is used to transport agricultural commodities when

A. perishable items are to be transported
B. speed and quick availability of transportation are needed
C. small items are to be transported
D. special hauling and accommodations are needed

37. Which of the following expenses are not deductable on federal income taxes?

A. Personal telephone use
B. Office electric billings
C. Real estate interest payments
D. None of the above are deductable

38. If you itemize deductions on your federal income tax return, which of the following personal items are deductable?

A. Home entertainment
B. Auto interest payments
C. Liability insurance
D. All of the above

39. The sales ticket is important to the agricultural business firm because

A. it is a permanent record of the transaction
B. it is a part of the accounting and bookkeeping system
C. it provides a record for the customer
D. all of the above

40. The most expensive way to borrow money is by the

A. easy payment plan
B. add-on interest plan
C. simple interest plan
D. none of the above

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41. Workmen's Compensation Insurance does not cover

A. hospitalization costs
B. medical expenses
C. lost time from work
D. retirement and disability

42. Which of the following vehicle insurance coverage is the most expensive?

A. Property damage
B. Medical payment
C. Collision
D. Uninsured motorist

43. Real estate value, for tax purposes, is based on

A. the taxable market value
B. the appraised market value
C. the appraised selling value
D. a percentage of current market value

44. Money used for state government activities are collected primarily as

A. federal income tax
B. state income tax
C. estate tax
D. gasoline tax

45. Which of the following is not a tax in the American tax system?

A. Income tax
B. Real estate tax
C. Purchase tax
D. Personal property tax

46. A good rule for a salesperson in an agricultural business firm to follow is "All shoplifters look alike."

A. True
B. False

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47. Depreciation is allowable on machinery used in a business due to

A. wear
B. damage
C. obsolesence
D. all of the above

48. Sometimes mark-up is figured on the selling price instead of the cost. An item that sells for $2.00 has a 25% mark-up on the selling price. What is the mark-up on the cost?

A. 22%
B. 33 1/3%
C. 50%
D. 30%

49. Selling price usually compensates for

A. profit
B. overhead costs
C. wholesale cost
D. all of the above

50. A restrictive endorsement on a check

A. limits further negotiation of the check
B. limits the amount of the check
C. indicates payment in full
D. none of the above

END OF TEST

FORM B

AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TEST

1. An agricultural business firm advertises

   A. to produce immediate sales
   B. to create demand
   C. to attract customers
   D. all of the above

2. How much would a 20-second spot twice a week for one month cost if the costs of advertising at the local station are as follows

20-second spot - $ 3.75
1-minute - $ 4.50
1/2 hour - $30.50

   A. $29.25
   B. $30.00
   C. $31.75
   D. $30.25

3. The costs for advertising on the local TV station are as follows

	60 seconds	30 seconds	20 seconds	10 seconds
Spot buys:	4:00 p.m. to 8:00 p.m.			
Class A	$15.00	$12.00	$9.00	$6.00
	8:00 p.m. to sign-off			
Class B	$12.00	$ 9.00	$6.00	$3.00
	Sign-on to 4:00 p.m.			
Class C	$10.00	$ 8.00	$4.00	$2.00

Minimum order: 10 spots

Using this information a 60-second spot at 5:00 p.m. 2 times a week for a month would cost

   A. $150.00
   B. $120.00
   C. $ 80.00
   D. $ 96.00

4. Which of the following is (are) important to consider when constructing point of purchase displays?

   A. Traffic movement
   B. Location to related merchandise
   C. Seasonal sales
   D. All of the above

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5. Which of the following is not an important principle that should be used in developing an advertising calendar?

   A. Seasonal variation
   B. Lead time
   C. Equal spacing of ad emphasis
   D. None of these

6. A customer buys a 10-pound bag of lawnseed. Which of the following related items should the salesperson suggest to the customer?

   A. Renting a seeder
   B. Fertilizer
   C. Mulching materials
   D. All of the above

7. Which of the following is (are) common customer objections?

   A. Price
   B. Quality
   C. Service
   D. All of the above

8. If the customer says "The price on this lawn mower is too high," a salesperson should

   A. tell the customer to go to another store
   B. show similar items of different price ranges
   C. admit to the objection but emphasize service
   D. none of the above

9. Which of the following is not an advantage of substitute sales?

   A. Saves time for the customer
   B. Often builds good will
   C. May save a lost sale
   D. None of the above

10. A good salesperson suggests purchases of related items.

   A. True
   B. False

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11. The quality indicated when a salesperson puts "everything he has" into the sale is

    A. enthusiasm
    B. honesty
    C. aggressiveness
    D. integrity

12. Which of the following are not characteristics of a successful salesperson?

    A. Cheerfulness, courtesy, and tact
    B. Friendliness and enthusiasm
    C. Sincerity, initiative, application
    D. None of the above

13. As a salesperson in an agricultural supply business, what type (s) of customers will you usually be dealing with?

    A. Customers who first have to be sold on the need for the product you are selling
    B. Customers who have already decided that they need your product but are not sure they like your brand
    C. Both A and B
    D. Neither A nor B

14. There is no set time for closing a sale.

    A. True
    B. False

15. What is out-of-store advertising?

    A. Arranging some products in front of the store in the summer
    B. Advertising through newspapers, TV, direct mail and roadsigns
    C. Getting some high school students to make graffiti on buildings
    D. None of the above

16. Which of the following statements is true about radio advertising?

    A. Talk about products that can only be sold through radio
    B. Use fast, hardhitting spot messages
    C. Stress advantages of products in detail
    D. None of the above

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17. What is the main function of an agricultural supply business?

A. To provide supplies and services needed by agriculturalists
B. To protect the farmers' investment
C. To offer free advice to farmers
D. To encourage competition among farmers

18. What records are used to determine profit and loss?

A. Profit and loss statements
B. Sales slips issued with each sale
C. Bank statements
D. Net worth statement

19. Display advertising is used to attract the customer's attention since people learn more through their sense of sight than any other sense.

A. True
B. False

20. A good salesperson gives customers literature available on the item or product they are interested in purchasing.

A. True
B. False

21. A farmer has 1,140 bushels of corn in storage from October 20 to January 3. What is his storage fee if the elevator charges 1/20¢ per day per bushel?

A. $37.28
B. $37.48
C. $38.28
D. $38.48

22. A contract is

A. an agreement
B. an offer
C. an acceptance
D. all of these

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23. The most common reason for people being fired from their jobs is

A. talking too much with customers
B. inability to get along with their fellow workers
C. not talking enough with customers
D. high pressure selling

24. After unloading bulk feed, the driver for the Agriculture Supply Store accidentally backed into the farmer's feed spout and broke it. Which of the following should the delivery person do?

A. Go back and try to fix the feed spout
B. Report the damage to the manager and let him handle it
C. Forget about it and hope the farmer will think someone else did it
D. Hire a repair man to fix it and pay for the repair

25. An agricultural business cannot survive without which of the following?

A. Employees
B. Customers
C. Stockholders
D. Cooperatives

26. The purpose (s) of human relations in business is (are)

A. gaining the cooperation of people
B. getting them to produce more
C. helping people get satisfaction from their work
D. all of the above

27. Most employers look for leadership potential in new employees because they like to promote people from within the organization rather than fill top jobs with people from outside the company.

A. True
B. False

28. In many businesses the management evaluates the human relations of the business by

A. self-satisfaction of employees
B. morale or attitude surveys
C. criticisms and suggestions of customers
D. number of employees who have been dismissed

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29. "Grading and standardizing" as a marketing function is

A. putting the product in a salable form
B. preparing a product to better meet the demand of the market
C. moving the product from one location to another
D. gathering raw products at a convenient place

30. "Packaging" as a marketing function is mainly concerned with

A. putting the product in a salabe form
B. making the product attractive
C. making the product transportable
D. all of the above

31. Which of the following is not a type of livestock market?

A. Terminal
B. Auction
C. Jobber
D. Direct

32. Pasteurizing milk means

A. heating the milk to kill bacteria
B. breaking down fat globules in milk
C. blending milk to the butterfat percentage
D. blending butterfat with skim milk

33. "Futures" market quotations refer to

A. markets of the future
B. price guaranteed for the future
C. tomorrow's price for today's contract
D. all of the above

34. The gross weight on a scales ticket refers to the

A. weight of the truck and cargo
B. weight of the truck only
C. weight of the cargo only
D. weight of the truck minus the cargo

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35. In establishing railroad freight rates, an advantage is given for

A. heavier loads and longer distances
B. lighter loads and shorter distances
C. heavier loads and shorter distances
D. lighter loads and longer distances

36. When compared with other types of transportation, rates for air freight are

A. always the highest for the amount carried
B. sometimes the highest for the amount carried
C. about the same as other rates when all factors are considered
D. usually lowest for the amount carried

37. Federal income taxes generally apply both to individual and business operations.

A. True
B. False

38. Real estate tax rates are expressed in terms of mills. If the tax rate is 46.20 mills, the amount of tax (in dollars) for each $1,000 tax value is

A. $4.60
B. $42.20
C. $462.00
D. $4,620.00

39. A customer's sales transaction was $11.36 and he presented a $20 bill in payment. Using the least number of articles of money, the change returned by the salesperson would be

A. 4 pennies, 1 dime, 1-50¢ piece, 4-$1 and 1-$5
B. 4 pennies, 2 dimes, 1-50¢ piece, 3-$1 and 1-$5
C. 4 pennies, 1 dime, 1-50¢ piece, 3-$1 and 1-$5
D. none of the above

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40. An agricultural supply business offers a $3.00 per ton discount on fertilizer orders of 10 tons or more. The business also offers a 2% discount for cash. What is the cost to a farmer who orders 10 tons of fertilizer @ $72.00 per ton for which he will pay cash?

A. $702.60
B. $676.20
C. $675.60
D. Depends on the analysis ordered

41. A disadvantage of offering credit to customers in an agricultural business is

A. credit holds good customers
B. credit helps get new customers
C. credit makes doing business a high risk
D. credit requires more booking

42. Public liability insurance covers all of the following except

A. when a dog bites a salesman
B. when a customer falls and breaks a leg
C. when property is damaged by wind or hail
D. when there are hogs on a highway

43. Schools are operated primarily on money from

A. city income taxes
B. state income taxes
C. real estate taxes
D. personal property taxes

44. When verifying the accuracy of a monthly bank balance, the depositor must consider

A. beginning bank balance
B. service charges
C. outstanding checks
D. all of the above

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45. The Agricultural Supply Store marks up items 50% on cost. The cost to the store for one dozen hammers is $24.00. What must be the price of each hammer to get the desired mark-up?

A. $1.50
B. $2.40
C. $2.50
D. $3.00

46. The axiom, "You can't do business from an empty wagon," stresses the importance of inventory control. The main reason for inventory control is

A. to always keep the inventory down
B. to have oversupply which allows for special discounts and sales
C. to maintain a proper balance of inventory
D. all of the above

47. Which of the following is the correct formula for figuring depreciation?

A. Salvage value minus cost divided by the years of use
B. Cost minus salvage value divided by years of use
C. Salvage value times 50% times years of use
D. None of the above

48. A single person works at a feed mill after school and on Saturdays. During 1973 he earned $1,665.48. His employer reported this amount of wages on the W-2 Form and indicated that $92.00 had been withheld for Federal Income Tax. This person

A. does not have to file a Federal Income Tax report
B. will be refunded the $92.00 withheld from his wages automatically
C. must file a Federal Income Tax report
D. does not have to pay income tax if he is a student

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49. Which of the following kinds of income is (are) taxable?

A. Wages from employment
B. Tips from services
C. Profit from a project
D. All of the above

50. A corporation had earnings of $35,000 during 1973. What would be the tax on this corporation's earnings according to the following schedule?

22% on earnings up to $25,000
48% on earnings over $25,000

A. $10,300
B. $13,000
C. $20,600
D. $26,000

END OF TEST

FORM C

AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TEST

1. It costs $1.42 per column inch to place an ad in the Display Ad Section of the newspaper. A Display Ad 2 inches wide and 6 inches deep would cost

   A. $17.04
   B. $16.24
   C. $18.62
   D. $17.24

2. How much would a 1/2 hour program once each month for 1 year cost if the costs of advertising at the local radio station are as follows

   20-second spot - $ 3.75
   1 - minute - $ 4.50
   1/2 hour - $30.50

   A. $340.50
   B. $347.50
   C. $355.50
   D. $366.00

3. Which of the following is not a major feature of position media?

   A. Repetition
   B. Concentration
   C. Flexibility
   D. Mobility

4. An agricultural business firm had a sales volume last year of $122,500. If the advertising budget for this year is set at 1% of last year's sales volume, the amount budgeted for advertising this year would be

   A. $ 122.50
   B. $1,225.00
   C. $12,250.00
   D. Cannot be determined from data given

5. When developing advertising copy, which of the following characteristics of customers should be considered?

   A. Psychological makeup of the market
   B. Educational makeup of the market
   C. Numerical makeup of the market
   D. Both A and B

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6. As an employee in an Agriculture Supply Store, you are assigned the responsibility of preparing an advertising calendar. What month would you begin to schedule advertisements for seed corn?

A. April
B. November
C. May
D. March

7. In planning the advertising calendar for a Horticulture Supply Store, what month would you schedule advertising for bag fertilizer?

A. February
B. August
C. June
D. November

8. If a customer says "This is not what I had in mind," a salesperson should

A. emphasize service
B. show similar items of different price ranges
C. admit to the objection but show other features
D. show more goods

9. A substitute item for a box-end wrench is

A. an adjustable wrench
B. a pair of vice grips
C. an open-end wrench
D. none of the above

10. The major products handled by agricultural supply businesses are

A. feeds and seeds
B. fertilizers and chemicals
C. small equipment and hand tools
D. all of the above

11. The first thing a salesperson has to sell is

A. his/her school
B. himself/herself
C. his/her experience
D. products

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12. Which of the following are characteristic of a salesperson who makes a good impression?

    A. Courtesy
    B. Tact
    C. Cheerfulness
    D. All of these

13. A salesperson who is friendly, alert, courteous, and has a confident approach to the customer will always get favorable attention from the customer.

    A. True
    B. False

14. What is more likely to happen when a customer is high pressured?

    A. The customer thinks something is wrong and becomes cautious
    B. The customer will buy more quickly
    C. The customer shows more interest in the product
    D. The customer likes high pressure selling

15. What is point-of-purchase advertising?

    A. Ads in and around the place of business
    B. Telling a customer about another product
    C. Advertising only products farmers are interested in
    D. Advertising products in the classified ad section of newspapers

16. Which of the following is not a type of business ownership?

    A. Individual proprietorship
    B. Partnership
    C. Corporate ownership
    D. Stewardship

17. Long-term credit is usually used when buying

    A. land and real estate
    B. farm machinery
    C. agricultural buildings and facilities
    D. none of the above

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18. When working in a farm supply store a farmer asks you what varieties of wheat are recommended for the area. How would you answer the question?

    A. Ask him what variety he grew last year and recommend that he use it again this year
    B. Check a reference book at the store (such as the Agronomy Guide) and show him what varieties are recommended for the area
    C. Tell him that you are sorry but that you do not know
    D. Tell him that he will have to check with the agriculture teacher or county agent to get that kind of information

19. Which of the following should not be used by a good salesperson when handling customers' sales objections?

    A. Give a long and informative reply
    B. Know when to stop talking
    C. Get at the real problem
    D. None of these

20. A good salesperson in an agribusiness firm should demonstrate the product, if possible, because this shows the customer how the product operates.

    A. True
    B. False

21. The price of corn at harvest is $1.25 per bushel. On January 15th the price of corn is $1.53 per bushel. The cost of storing corn at the elevator is 1 1/2 ¢ per bushel per month. How much will a farmer make if he stores 1,800 bushels of corn from Ocotber 15th to January 15th instead of selling the corn at harvest?

    A. $324.00
    B. $423.00
    C. $504.00
    D. Cannot be calculated from information given

22. An advantage of leasing instead of purchasing a piece of agricultural equipment is

    A. lease payments on rentals may be deducted as operating expenses
    B. the leasor is responsible for major repairs
    C. the leasee is relieved of all personal liability
    D. all of these

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23. The manager of an agriculture supply store observes a salesperson make a mistake when dealing with a customer. After the customer leaves the store, the manager should

A. fire the salesperson on the spot
B. not say anything to the salesperson because pointing out mistakes is discouraging
C. point out the mistake to the salesperson and tell the salesperson how to avoid future mistakes
D. require the salesperson to write a letter of apology to the customer

24. The supervisors in an agricultural business will usually be the owner of the business, the manager, or a foreman. These persons hold supervisory positions because

A. of their ability to give orders to employees
B. they do more work than other workers
C. of their past experience or success
D. none of the above

25. A salesperson who wants to improve in salesmanship ability should

A. ask a friend to come by and offer advice
B. not let the employer know that he wants help in becoming a better salesperson
C. not tell anyone, but get more experience in selling
D. ask the employer for suggestions for becoming a better salesperson

26. First impressions are almost always based on the salesperson's

A. manners
B. appearance
C. shoeshine
D. hair style

27. What indicates how the responsibility, authority, and work of a business are divided into smaller units with specialized activities in order to achieve the objectives of the business?

A. An organizational chart
B. The number of supervisors in the business
C. The vertical and horizontal chart
D. The speeches made by the manager

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28. The most important traits called for in good customer relations are

A. self-discipline and psychology
B. human behavior and getting along with others
C. unstructured hyman relations and good manners
D. tact, courtesy and respect

29. "Transportation" as a marketing function is closely related to

A. assembling and storing
B. processing and packaging
C. grading and standardizing
D. buying and forming

30. Which of the following is usually not a handler of agricultural products from the producer to consumer?

A. Retailer
B. Wholesaler
C. Jobber
D. Drop shipper

31. Which of the following has a dressing percentage of approximately 75%?

A. Market hogs
B. Steers
C. Market lambs
D. Veal calves

32. Which of the following needs to be done to get eggs ready for sale?

A. Washing
B. Candling
C. Packaging
D. All of these

33. Which of the following is the most common discount applied when marketing corn?

A. Moisture
B. Shrunken kernels
C. Insect damage
D. Disease damage

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34. The tare weight on a scales ticket refers to the

A. weight of the truck and cargo
B. weight of the truck only
C. weight of the cargo only
D. weight of the truck minus the cargo

35. The agreement made between the shipper and carrier for each shipment of merchandise by railroad or truck is

A. an invoice
B. a receipt of goods shipped
C. a bill of lading
D. a bill of insurance

36. Which of the following is not required to pay federal income taxes?

A. Partnerships
B. Cooperatives
C. Corporations
D. Individuals

37. Which of the following taxes are not paid to state or local tax agencies?

A. Personal property tax
B. Federal income tax
C. City income tax
D. State income tax

38. Which of the following is usually not financed by real estate taxes?

A. Building of interstate roads
B. Building of township roads and bridges
C. Building of joint vocational schools
D. Building of county courthouses

39. Magnetic symbol numbers on checks usually indicate

A. the date the check is written
B. the account number of the customer
C. the amount of the check
D. the payee

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40. Agricultural business firms sometimes allow discounts on

A. early orders
B. pre-inventory orders
C. quantity orders
D. all of the above

41. An agricultural business would send which of the following to customers at the end of the month?

A. Net worth statement
B. Monthly statement
C. Financial statement
D. Credit statement

42. A company's term life insurance policy will usually offer the greatest benefits to

A. the younger employee
B. the mid-aged employee
C. the older employee
D. all of these

43. Which of the following auto insurance coverages is required by state law on all vehicles?

A. Comprehensive
B. Liability
C. Bodily injury
D. Collision

44. The person who receives the face value of a life insurance policy in case of the death of the policy holder is

A. the estate manager
B. the trustee
C. the beneficiary
D. the bank official

45. The more money a person is paid during the year or the higher the profits of a business, the higher the tax rate.

A. True
B. False

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46. Personal property tax is applied to an automobile when the automobile is used in the business.

    A. True
    B. False

47. How much depreciation could be taken per year on a feed mixer costing $2,800.00 with a salvage value of $400.00 and an expected life of eight years?

    A. $350.00
    B. $250.00
    C. $300.00
    D. $400.00

48. The record of purchases and sales adjusted to an inventory record is

    A. a physical inventory
    B. a perpetual inventory
    C. an exact inventory
    D. none of the above

49. Sometimes mark-up is figured on the selling price instead of the cost. A hammer that sells for $2.00 has a 25% mark-up on the selling price. What is its cost?

    A. $1.50
    B. $2.00
    C. $1.75
    D. $2.25

50. A purchase order indicates the

    A. quantity of merchandise ordered
    B. selling price of the merchandise
    C. the date the order is shipped
    D. all of the above

END OF TEST

APPENDIX G

OBJECTIVES

FARM MANAGEMENT
(MANAGEMENT OF PRODUCTION AGRICULTURE BUSINESS)

OBJECTIVES
FARM MANAGEMENT
(MANAGEMENT OF PRODUCTION AGRICULTURE BUSINESSES)

A. Students will be able to establish salvage values for machinery and equipment and purchased breeding livestock.

Test Items

Form A, Item 28
Form C, Item 27

B. Students will be able to calculate depreciation for (a) purchased breeding livestock, (b) machinery and equipment, and (c) buildings and improvements.

Test Items

Form A, Items 26, 29, 30, 32
Form B, Items 2, 25
Form C, Items 24, 26, 28, 29

C. Students will be able to identify depreciable and nondepreciable assets and establish inventories for depreciable and nondepreciable assets.

Test Items

Form B, Items 23, 24, 28, 29

D. Students will be able to compute capital gain or loss on items subject to capital gain or loss treatment.

Test Items

Form A, Items 33, 41
Form B, Items 26, 27
Form C, Item 30

E. Students will be able to prepare and analyze a net worth statement.

Test Items

Form A, Items 11, 12
Form C, Items 31, 33

F. Students will be able to evaluate marketing services and choose the service which will provide the greatest net profit.

Test Items

Form A, Item 15
Form B, Item 8
Form C, Item 2

G. Students will be able to apply profit-maximizing principles in organizing the farm business such as (a) diminishing returns, (b) fixed-variable costs, (c) opportunity costs, and (d) substitution.

Test Items

Form A, Items 4, 5, 7, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 34
Form B, Items 4, 13, 14, 15, 16, 18, 19, 20, 21, 22, 32
Form C, Items 5, 17, 18, 19, 20, 21, 22

H. Students will be able to outline and use a total insurance plan for a farm business to maximize net profit.

Test Items

Form A. Item 42
Form B, Items 38, 41, 42, 43, 44
Form C, Items 40, 41, 42, 43

I. Students will be able to calculate the cost of borrowing money.

Test Items

Form A, Item 39
Form B, Items 35, 39
Form C, Items 23, 39

J. Students will be able to calculate the total cost per unit of production.

Test Items

Form A Items 3, 9, 10
Form B, Items 17, 31
Form C, Items 4, 9, 34

K. Students will be able to use the futures market when it is advantageous in marketing farm products.

Test Items

Form A, Item 6
Form C, Items 6, 7

L. Students will be able to select an accounting system for a specific farming operation and use the accounting system properly.

Test Items

Form A, Items 31, 35, 36, 37
Form B, Items 1, 30, 33, 34
Form C, Items 1, 25, 35, 36, 37

M. Students will be able to know, identify, and use marketing principles in operating the farm business.

Test Items

Form A, Items 1, 2, 8, 13, 14, 16
Form B, Items 3, 5, 7, 9, 10, 11, 12
Form C, Items 3, 8, 10, 11, 12, 13, 14, 15, 16

N. Students will be able to select credit agencies and use credit appropriately in operating the farm business.

Test Items

Form A, Items 38, 40
Form B, Items 36, 37
Form C, Item 38

O. Students will be able to identify the types of taxes and calculate taxes that are a cost of operating the farm business.

Test Items

Form B, Item 40
Form C, Item 32

APPENDIX H

MASTERY TESTS

FARM MANAGEMENT
(MANAGEMENT OF PRODUCTION AGRICULTURE BUSINESSES)

Form A
Form B
Form C

FORM A

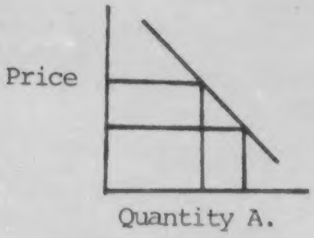
FARM MANAGEMENT MASTERY TEST

1. Which of the following is(are) condition(s) for a free market?

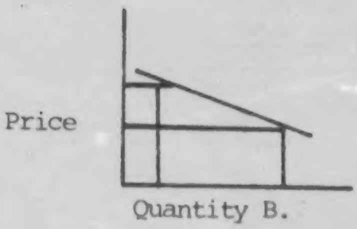
   A. No government interference to the supply and demand of a product
   B. No monopoly
   C. No consumer will control supply or demand
   D. All of the above

2. Which of the following is an illustration of elastic demand?

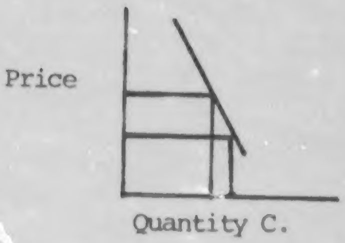
A.



B.



C.



D. None of these

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USE THIS TABLE TO ANSWER QUESTION 3.

Effect of Nitrogen on Corn

Lbs. N Applied	Yield (bushels)	Added Yield for 60 lbs. N	N Cost @ 25¢/lb. for add. 60 lb. N	Added Yield @ $2.50/bu.	Added Return Above N Cost
0	65	0	$ 0	$ 0.00	--
60	100	35	15	87.50	$20
120	130	30	15	75.00	15
180	150	20	15	50.00	5
240	170	20	15	50.00	5
300	165	-5	15	-122.50	-10

3. What yield level gave the highest net return?

   A. 130 bushels per acre
   B. 150 bushels per acre
   C. 165 bushels per acre
   D. 170 bushels per acre

4. Operating inputs can be substituted for other inputs if

   A. marginal returns equal total profits
   B. marginal costs are greater than marginal returns
   C. marginal costs equal marginal returns
   D. none of the above

5. An example of complementary interprises is

   A. hogs and corn
   B. beef cattle and dairy
   C. dairy and sheep
   D. hogs and meadow

6. A farmer and a buyer agreed that the farmer's beef cattle would be sold to the buyer for a total of $7,500 one year after the agreement was signed. This is an example of

   A. pure competition
   B. futures trading
   C. risk taking
   D. insured buying

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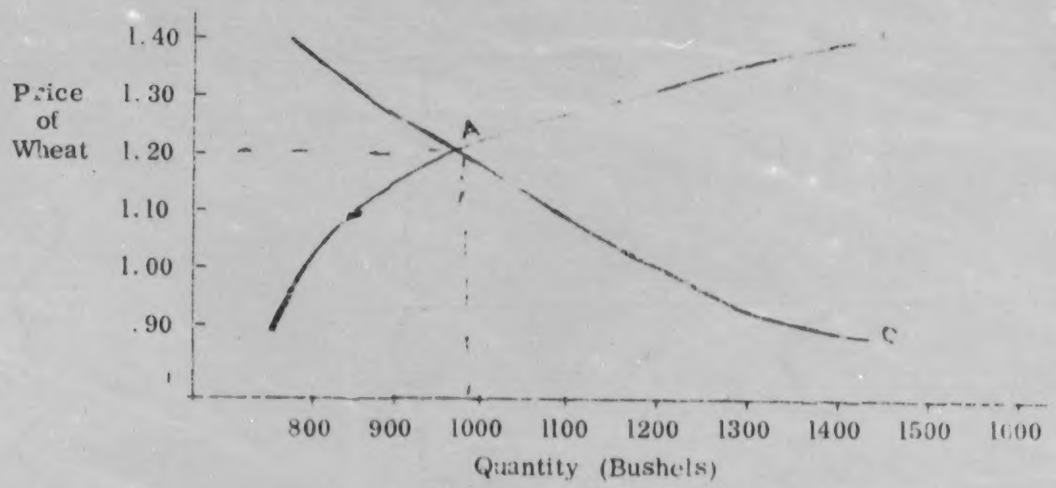
7. Combining crop enterprises to reduce uncertainty is advantageous for

   A. a farmer with unlimited capital
   B. a farmer with limited capital
   C. a farmer who is a good manager
   D. a farmer who only has two enterprises

8. Which is the demand curve on this chart?



   A. Line C
   B. Point A
   C. Line B
   D. None of the above

9. Using the following information, what is the total cost per acre to produce corn?

   Yield -- 110 bushels per acre
   Price of corn -- $2.50 per bushel
   Costs (per acre) -- Seed $8.00
   Chemicals $6.50
   Fertilizer $40.50
   Tractor and machinery use $19.00
   Labor $19.50
   Land value $435.00 (6% interest)
   Taxes $6.00

   A. $55.00
   B. $99.50
   C. $125.60
   D. $275.00

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10. Using the following information, what is the net return per acre from producing corn?

Yield -- 110 bushels per acre
Price of corn -- $2.50 per bushel
Costs (per acre) -- Seed $8.00
Chemicals $6.50
Fertilizer $40.50
Tractor and machinery use $19.00
Labor $19.50
Land value $435 (5% interest)
Taxes $6.00

A. $125.60
B. $149.40
C. $275.00
D. Cannot be determined

11. Net cash income is not an accurate picture of true farm returns because

A. beginning and closing inventories are not accounted for
B. depreciation is not considered
C. it does not include cash value of farm products consumed by the family
D. all of the above

12. Which of the following is the best measure of net farm returns?

A. Net cash income
B. Net farm income
C. Total cash receipts
D. What goes to the savings account

13. Other things being equal, the greater the supply of an agricultural product

A. the lower the price paid
B. the higher the price paid
C. the same price paid
D. none of the above

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14. If the price of an agricultural commodity is too low, demand will be greater than the supply resulting in

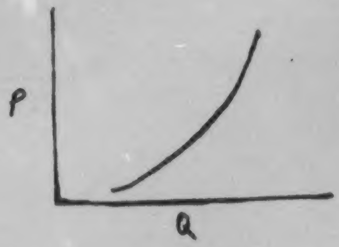
A. a surplus
B. a monopoly
C. a shortage
D. a slump

15. A marketing channel is

A. the route a product takes on its way from producer to consumer
B. the way a product is transported to the market place
C. the line of communication between the buyer and seller
D. the process of receiving market information via TV

16. The diagram shown below represents which of the following curves?

A. A supply curve
B. An equilibrium curve
C. A demand curve
D. A unit elasticity curve



17. With limited capital, a farm operator would tend to invest available capital in

A. long-term land improvements
B. quick turnover operations
C. new machinery and equipment
D. labor saving equipment

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18. A farmer has $12,000 to invest in his farm business. He is presently raising 400 acres of small grain and has been harvesting with his own combine, but the combine needs to be replaced. The cost of harvesting with his own combine is $8 per acre while custom combining costs $10 per acre. He can save $800 each year by doing his own combining. If the present combine can be replaced for $12,000, the $800 he saved by doing his own harvesting is about a 7% return on his investment. If the $12,000 were invested in additional dairy cows, it would return $3,000 above costs. What should the farmer do?

    A. Replace the combine and continue harvesting small grain because he saves $100 per year
    B. Invest the money in dairy cows and hire the combining done
    C. Plant more acres of small grain in order to reduce fixed costs on the combine
    D. Invest in a smaller combine which would still get the harvesting done efficiently

19. Whether or not a farm operator should adopt a soil improvement plan requiring an immediate large outlay of capital in order to insure a higher income in five years will depend upon

    A. the present need for income
    B. the current rate of interest on borrowed money
    C. the potential for increasing his farm output and his present cash flow sheet
    D. all of the above

20. To secure maximum profit through increased milk production, a dairyman should increase the daily ration fed dairy cows until the cost of the last pound of additional feed is

    A. greater than the value of the increased unit of milk production
    B. less than the value of the increased unit of milk production
    C. equal to the value of the increased unit of milk production
    D. one-half the value of the increased unit of milk production

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21. A farmer has been feeding cattle on his 300-acre farm since 1965 with the help of an up-to-date set of machinery and a good full-time hired man. He has always fed out 75 head of calves and 50 head of yearlings per year. Over the last 5 years he has invested $20,000 in his cattle feeding operation for buildings and modern feeding equipment. His net income has decreased even with the addition of efficient feeding facilities and he cannot understand why. Can you explain the reason?

A. Cattle feeders can expect losses for several years in a row
B. He should have fed out all yearlings
C. He has increased overhead costs without changing his volume of business
D. He made the wrong choice of enterprises as dairying is a better enterprise

22. The major reason for diversifying crop enterprises is to

A. increase efficiency
B. spread labor evenly throughout the year
C. reduce production costs
D. lower machinery investment

23. In your judgment, which of the following farm operators would be more inclined to invest in a long-range soil conservation plan?

A. A beginning farmer who is short on capital
B. A tenant with a long-term lease
C. An owner-operator with money in a savings account
D. An owner-operator who is heavily in debt

24. Based on the table below showing the yield of wheat per acre at different levels of nitrogen used, which statement is most nearly correct?

No. of Lbs. of Nitrogen Added	Total Yield Per Acre
0	30 bushels
10	38 bushels
20	42 bushels
30	44 bushels
40	45 bushels

A. The bushels added to the total yield by each successive 10 lbs. of additional nitrogen increase at a uniform rate
B. The bushels added to the total yield by each successive 10 lbs. of additional nitrogen increase at a diminishing rate
C. The bushels added to the total yield are greatest at the 20 lbs. level
D. The 40 lbs. rate will yield the best return on a farmer's investment in fertilizer

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25. Assuming that a farmer is efficiently managing his farm business, the last dollar spent on a factor of production (such as seed, fertilizer, machinery, or buildings) will yield a marginal or added return

A. greater than the last dollar earned from all other factors of production
B. exactly equal to the last dollar earned from all other factors of production
C. less than the last dollar earned from all other factors of production
D. twice as large as the last dollar earned from all other factors of production

26. What is the annual depreciation of a moldboard plow purchased at a price of $1,250? This plow has an expected useful life of 10 years.

A. $250
B. $125
C. $1,250
D. Cannot be calculated from the given information

27. From the following table, it is evident that diesel fuel is less expensive than gasoline. However, before you substitute gasoline with diesel tractor fuel, what other factors should you consider?

Days of Work	Gallons of Gasoline Used	Diesel Fuel Used to Replace Gas
5	75	60
10	150	120
15	225	180
20	300	240

A. Initial investment
B. Repairs and parts
C. Depreciation
D. All of the above

28. Which of the following would most likely have a salvage value after the designated life?

A. Purchased bull five years old
B. Grinder mixer after 12 years
C. Hog feeder after 12 years
D. Farrowing crates after 15 years

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29. To use the additional first year depreciation, items must be set up for at least six years. On which of the following could the additional first year depreciation be used?

    A. Farm house with 25-year life
    B. Grain drier with 5-year life
    C. Land
    D. Machinery shed with 20-year life

30. The undepreciated value of tile purchased 10 years ago which originally cost $20,000 and is being depreciated over a 25-year life is

    A. $4,000
    B. $8,000
    C. $12,000
    D. $16,000

31. Which of the following is the best proof of purchase for a farmer's record system?

    A. Cancelled check
    B. Original invoice
    C. Cash register sales slip
    D. The purchased item

32. The method of depreciation which does not recognize salvage value in the calculation is

    A. straight line
    B. declining balance
    C. sum-of-the-year digits
    D. appreciation

33. A farmer purchased a cow in November 1972 for $1,000. He sold the cow in May 1974 for $500. The depreciation taken on the cow since November 1972 was $400. Which of the following is an accurate statement about this transaction?

    A. There was a $500 long-term capital loss
    B. There was a $500 short-term capital loss
    C. There was a $100 short-term capital loss
    D. There was a $100 long-term capital gain

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34. A farmer should figure probable farm income before the close of the tax year in order to

A. minimize taxes for that year
B. maximize income after tax
C. income average
D. maximize income

35. The purchase of steers will be entered in which of the following expense columns in the farm account book?

A. Livestock supplies
B. Capital investment
C. Veterinary and medicine
D. None of the above

36. The purchase of license plates for the farm truck would be entered in which of the following expense columns in the farm account book?

A. Taxes
B. Machinery costs
C. Automobile
D. Machine hire and trucking

37. The amount a farmer pays for life insurance premiums is entered in which of the following expense columns of the farm accounting system?

A. Debt repayment
B. Taxes
C. Family living expense
D. Miscellaneous

38. Which of the following kinds of information will be most helpful to a farmer applying for a loan to buy feeder cattle?

A. Information that he is owner of a 4020 John Deere tractor
B. A good set of records and analysis of previous livestock raised
C. A copy of his income tax forms from the previous year
D. A $500 savings bond

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39. A $4,000 loan at 12% interest on full principle is to be paid back in 12 monthly installments. What is the amount of each monthly payment?

    A. $400.00
    B. $373.33
    C. $453.33
    D. $500.00

40. Which of the following is not a practice for developing a good credit rating?

    A. Keep good records of farm enterprise
    B. Make loan payments on time
    C. Borrowing from a credit agency to pay off a loan made by a bank
    D. Filling out loan applications with correct information

41. A farm was purchased for $50,000. (Land-$30,000; depreciable farm buildings-$20,000; no dwellings.) Total depreciation claimed to date has been $15,000 on the farm buildings. A new milking parlor was constructed two years ago for $13,000. The farm sold for $100,000. What will be the amount of the sales value subject to capital gains tax?

    A. $100,000
    B. $ 50,000
    C. $ 52,000
    D. $ 48,000

42. The amount of Workmen's Compensation Insurance paid is based on

    A. age of employees
    B. sex of employees
    C. years of service
    D. dollars of payroll

END OF TEST

FORM B

FARM MANAGEMENT MASTERY TEST

1. The fundamental principle in which of the following accounting systems is the balancing of assets and equities or claims?

   A. Cash basis
   B. Accrual basis
   C. Double entry accounting
   D. Modified single entry accounting

2. A John Deere tractor was bought two years ago at a cost of $10,000. The depreciation rate was determined to be 15 percent per annum. What is the adjusted basis of the tractor assuming a zero salvage value?

   A. $13,000
   B. $ 8,500
   C. $ 7,000
   D. Cannot be determined from information given

3. A conclusion that is not appropriate from the data in the following table is

Supply Schedule of Soybeans

Price of Soybeans/bu.	Quantity sold per unit of time (Millions of Bu.)
$6.65	1,625
$6.28	1,403
$6.15	1,010
$5.89	989
$5.77	875

   A. as price goes up, the supply also increases
   B. price is an expression of demand
   C. supply schedule can be changed only by price
   D. supply is affected by price or demand for that product

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USE THIS TABLE TO ANSWER QUESTION 4.

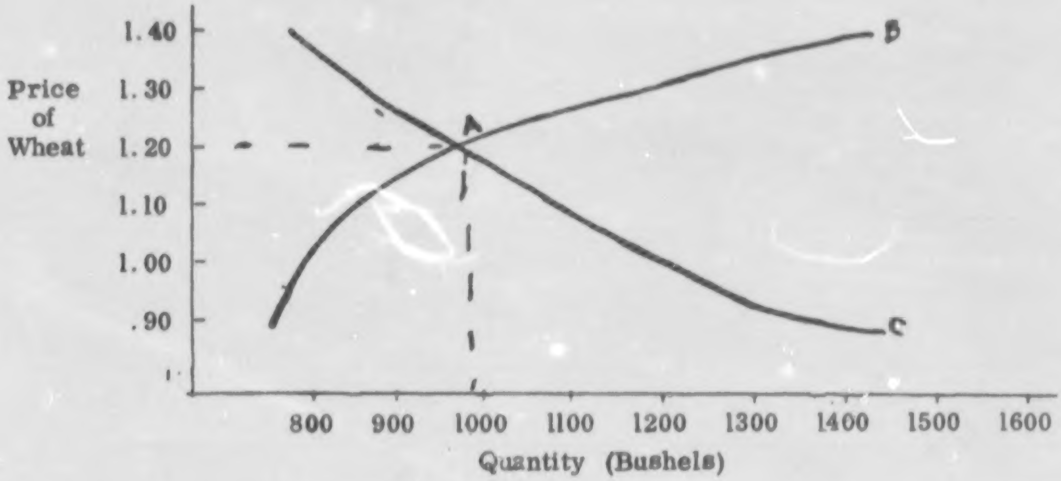
Effect of Nitrogen on Corn

Lbs. N Applied	Yield (bushels)	Added Yield for 60 lbs. N	N Cost @ 25¢/lb. for add. 60 lb. N	Added Yield @ $2.50/bu.	Added Return Above N Cost
0	65	0	$ 0	$ 0.00	--
60	100	35	15	87.50	$20
120	130	30	15	75.00	15
180	150	20	15	50.00	5
240	170	20	15	50.00	5
300	165	-5	15	-122.50	-10

4. What is the cost of each 60 lb. unit of nitrogen added?

A. $5.00
B. $10.00
C. $15.00
D. $50.00

5. What is the equilibrium price for wheat indicated on this chart?



A. $ .90
B. $1.40
C. $1.20
D. Can't be determined

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6. What part of a record book includes all items of farm income and expenses not included in the inventory?

   A. Non-farm items
   B. Farm business items
   C. Cash accounts
   D. None of the above

7. For the demand of an agricultural product to be effective, it must be backed by

   A. a desire on the part of the consumer to buy it
   B. a willingness to pay the price
   C. a need for the product
   D. a willingness and ability of the consumer to pay the price

8. Marketing is all business activities involved in the flow of goods and services from the point of initial production until they are in the hands of the

   A. wholesaler
   B. consumer
   C. retail store processor
   D. food market

9. The amount (or quantity) of goods or services that will be purchased at a specific time and place is called

   A. demand
   B. supply
   C. market
   D. utility

10. The quantity of a luxury item purchased in comparison with a necessity item would be

    A. affected less by price change
    B. affected equally by price change
    C. little changed by a change in price
    D. affected more by price change

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11. The role of price in a free market is to serve as a guide

    A. in controlling supply
    B. in limiting demand
    C. to how important an item is to the consumers
    D. in deciding what, when, and how much to produce

12. A supply schedule can be changed by a shift in

    A. income
    B. technology
    C. season of tne year
    D. all of the above

13. Assuming a farmer with limited capital can get $4 return for each $1 invested in protein supplement for hogs, he should invest his limited funds in a new crop variety if

    A. net profit on the crop is increased
    B. investments in new varieties return at least $4 for $1 of added costs
    C. investments in new varieties return more to net profit than investments in protein for hogs
    D. investments in new varieties increase yields per acre, crop quality, and total farm gross income

14. Assuming that 100 lbs. of pork can be produced either with 340 lbs. of corn and 15 lbs. of soybean meal or with 270 lbs. of corn and 40 lbs. soybean meal, which item below would be the most important for the farmer to consider before he makes the decision regarding which combination to feed?

    A. the price of soybean meal per pound
    B. the price of corn per pound
    C. the price of hogs per hundredweight
    D. the price of corn and soybean meal per pound

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15. Based on the "Return Per $100 Investment" table below, a farmer with $1000 to invest in his farm business should invest the most in

Returns Per $100 Investment

Capital	Bonds	Building	Machinery	Dairy Equipment
1st $100	$104	$155	$158	$170
2nd $100	104	148	143	160
3rd $100	104	136	139	151
4th $100	104	115	135	140
5th $100	104	100	130	136

A. bonds
B. buildings
C. machinery
D. dairy equipment

16. With a capital investment of $5,000 a farmer could install an automatic feeding system for his dairy cows. It is estimated that this system would save approximately 300 hours of chore labor per year. In order for the farmer to make a sound decision on whether or not to invest in this system, he would need to consider which of the following

A. the possible return on the $5,000 if invested elsewhere in the farm business or outside the farming business in a savings account
B. whether the labor saved could be profitable utilized elsewhere in the farm business
C. the annual fixed and variable costs for operating and maintaining the new feeding system
D. all of the above

17. When a farmer increases his investment in land, buildings, and equipment without increasing the total units of production, the cost per unit of production

A. decreases
B. increases
C. remains the same
D. varies with the operator

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18. If one lb. soybean meal will substitute for 1.2 lbs. of linseed meal of equal nutritional value and soybean meal sells for 5.2¢ per pound and linseed meal sells for 4¢ per pound, the livestock farmer who wishes to make the largest net income should

A. feed 68% soybean meal and 32% linseed meal
B. feed all soybean meal
C. feed 20% soybean meal and 80% linseed meal
D. feed all linseed meal

19. A beginning farmer with limited capital of $12,000 had to make a choice between the following two alternatives: (1) purchase a new combine (estimated life 10 years) for $12,000 or (2) purchase a used combine for $6,400 (estimated life 6-7 years) and have $5,600 to invest in needed lime and fertilizer. He decided to buy the used combine and have the $5,600 for other production uses on the farm. He made the correct decision. Why did he make the correct decision?

A. The annual savings in fixed costs on the used combine will be enough to replace the machine when it wears out
B. The added net return from the expenditure for lime and fertilizer will provide sufficient money to replace the machine when it wears out
C. The return on investment is higher on the used combine than on the new combine
D. Beginning farmers have the tendency to "over invest" in machinery and "under invest" in other production resources

20. A farmer can borrow only $400 for chemicals to control weeds on 100 acres of corn, 100 acres of wheat, and 100 acres of barley. Previous weed control trials have indicated that he can expect the following returns per $1 invested in chemicals.

Return Per Additional $1 Spent For Chemicals	Corn	Wheat	Barley
1st $100	$2.50	$1.50	$1.25
2nd $100	$2.25	$1.25	$1.00
3rd $100	$1.75	$ .75	$ .50
4th $100	$1.25	$ .50	$ .25

What should he do?

A. Put all $400 worth on corn
B. Put $300 on corn and $100 on wheat
C. Put $200 on corn and $200 on wheat
D. Distribute it evenly over all crops

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21. A dairyman is milking 50 Holstein cows with a yearly milk production record of 11,000 lbs. per cow. He has $25,000 capital to invest in his dairy enterprise. He had to make a choice between the following alternatives: (1) invest $25,000 in a modern feeding system or (2) invest $12,000 in a "conventional type" feeding system and have $13,000 to invest in higher producing cows. He decided to invest the $25,000 in the modern feeding system. He made the wrong decision. Why?

    A. The annual depreciation charge is more than he can profitably afford
    B. $25,000 is too much to invest in buildings and equipment for 50 cows
    C. The added returns from the investment in high producing cows would have yielded more profit to the farmer in the long run than the new feeding system
    D. His neighbors think he made a mistake

22. Machinery should be substituted for labor when

    A. there is plenty of labor
    B. the machinery is first placed on the market
    C. farm prices are beginning to go downward
    D. the value of labor saved is more than the increase in machinery cost

23. Which of the following is not a depreciable asset?

    A. Purchased dairy cow
    B. Raised boar
    C. Pick-up truck
    D. Concrete feedlot

24. Which of the following is a depreciable asset?

    A. Steer
    B. Land
    C. Raised breeding ram
    D. Field tile

25. Which is not considered accelerated depreciation?

    A. Straight line method
    B. Declining balance method
    C. Sum-of-the-year digits method
    D. Additional first year depreciation option

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26. Using the following information, what is the farmer's cost basis on the new machine?

Dealer's list price -- $10,000
Dealer's trade allowance on used machine -- $2,000
Farmer's undepreciated book value of traded item -- $3,000

A. $8,000
B. $11,000
C. $7,000
D. $10,000

27. Which of the following transactions will result in a capital gain or loss?

A. Sale of grain
B. Trade of farm machinery
C. Sale of farm
D. Purchase of farm machinery

28. Knowing the following information, a farmer wishes to separate in his depreciation schedule a tractor and plow that were purchased together.

List price of tractor -- $12,000
List price of plow -- $4,000
Dealer's allowance on traded tractor and plow -- $6,000
Farmer's unrecovered cost of tractor traded -- $2,500
Farmer's unrecovered cost of plow traded -- $500

What value would the new tractor and plow have?

A. Tractor $ 7,000; plow $3,000
B. Tractor $11,500; plow $1,500
C. Tractor $ 6,000; plow $4,000
D. Tractor $12,000; plow $4,000

29. "Adjusted basis" of an item is equal to

A. cost plus improvements minus depreciation
B. depreciation
C. equity
D. one-half of cost plus salvage value

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30. Which of the following is not an immediate part of a gross income calculation?

    A. Cash receipts
    B. Change in inventory
    C. Deduction of cost of feeder livestock purchased
    D. Value of sale of capital assets

31. Using the following information, what soybean yield is equal to a 120-bushel per acre corn yield in terms of dollars of profit per acre?

    Price of corn — $2.50 per bushel
    Price of soybeans -- $6.50 per bushel
    Cost of producing corn -- $200 per acre
    Cost of producing soybeans -- $160 per acre

    A. 50 bushels per acre
    B. 35 bushels per acre
    C. 45 bushels per acre
    D. 40 bushels per acre

32. A farmer's normal yield is 130 bushels of corn per acre and 45 bushels of soybeans per acre. He anticipates his cost of production to be $225 per acre on corn and $190 per acre on soybeans. If he can contract corn at $2.40 per bushel, at what price must he be able to contract beans to realize the same profit for each crop?

    A. $4.16
    B. $5.16
    C. $6.16
    D. $7.16

33. Which of the following items is entered in the "Livestock Supplies" expense column in the farm record book?

    A. Herbicide
    B. Steers
    C. Straw
    D. All of the above

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34. If a farmer contracts with a company for the aerial application of herbicide, the expense would be entered in which of the following expense columns of the farmer's records?

A. Hired labor
B. Machine hire and trucking
C. Crop supplies
D. Capital investment

35. A $16,000 loan for a combine at 8½% simple interest is to be paid in 4 equal payments over a 4-year period. How much will the first payment be after one year including both principle and interest?

A. $4,000
B. $5,360
C. $5,880
D. $6,400

36. From which of the following credit agencies would a farmer be more likely to obtain a 30-year loan for a 150 acre farm?

A. Production Credit Association
B. Prudential Life Insurance Company
C. BancAmericard
D. Federal Land Bank

37. A local bank will loan 75% of a person's net worth. A farmer has $120,000 worth of liabilities, total assets of $200,000, owns $50,000 worth of farm machinery and $130,000 worth of land and buildings. What will be the greatest amount of money the bank will loan him?

A. $285,000
B. $ 85,000
C. $100,000
D. $ 60,000

38. Which of the following is not a type of life insurance that can be purchased by farmers?

A. Whole life
B. Ordinary life
C. Medicare
D. None of the above

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39. Which of the following is not a method of calculating interest?

A. Add-on
B. Simple
C. Interest plus carrying charge
D. Rental

40. A farm is appraised at $120,000 for tax purposes. The tax assessment is on 40% of the appraised value and the total tax millage for the community is 42 mills per dollar of assessed value. What is the amount of property tax to be paid?

A. $400.00
B. $2,016.00
C. $420.00
D. $42.00

41. To protect himself in case a full-time or part-time employee would be injured, a farmer should carry

A. health insurance
B. farm liability insurance
C. Workmen's Compensation insurance
D. life insurance

42. If a farmer contracts someone to harvest his crops and the custom operator brings someone along to drive the truck, the farmer should

A. enroll the truck driver for Workmen's Compensation Insurance
B. not allow the truck driver on his property
C. check with the custom operator to see that the driver is covered under the custom operator's insurance policy
D. none of the above

43. If a farmer does not have Workmen's Compensation Insurance and an employee is disabled, the farmer is liable to

A. pay a penalty and back insurance
B. pay for the employee's recovery expenses
C. declare he wasn't aware of the law and not be liable
D. both A and B

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44. A farmer to be covered by Workmen's Compensation Insurance must have

- A. told his county agent that he is interested
- B. have at least one employee working for him
- C. paid at least one premium at the end of each six months of labor
- D. sent in a registration form even if no one is presently employed

END OF TEST

FORM C

FARM MANAGEMENT MASTERY TEST

1. The first step to be taken by a farmer beginning to keep records is

    A. set values or price on farm assets
    B. make a farm inventory
    C. determine investment value
    D. make a physical count of assets and liabilities

2. Which of the following is a method of selling livestock to the highest bidder?

    A. Terminal market
    B. Auction market
    C. Daily market
    D. "Off" market

3. One conclusion that can be made from the following table is

Demand Schedule of Milk

Price/half gallon	No. of Gallons purchased
$ .99	5,025
.90	5,780
.87	7,800
.83	9,500
.75	11,675
.65	12,250

    A. lower prices increase demand for milk
    B. higher prices decrease demand for milk
    C. demand for milk is elastic
    D. all of the above

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USE THIS TABLE TO ANSWER QUESTION 4.

Effect of Nitrogen on Corn

Lbs. N Applied	Yield (bushels)	Added Yield for 60 lbs. N	N Cost @ 25¢/lb. for add. 60 lb. N	Added Yield @ $2.50/bu.	Added Return Above N Cost
0	65	0	$ 0	$ 0.00	--
60	100	35	15	87.50	$20
120	130	30	15	75.00	15
180	150	20	15	50.00	5
240	170	20	15	50.00	5
300	165	-5	15	-122.50	-10

4. What is the added return above the cost of the second 60 lb. unit of nitrogen added?

   A. $20.00
   B. $15.00
   C. $5.00
   D. No added return

5. What do you call an enterprise that does not compete with any other enterprise for resources?

   A. Complementary
   B. Supplementary
   C. Competitive
   D. Good relationship

6. Which of the following is a protective procedure designed to maximize commodity marketing and processing losses that are due to adverse price changes?

   A. Crop insurance
   B. Speculating
   C. Hedging
   D. Using good market channels

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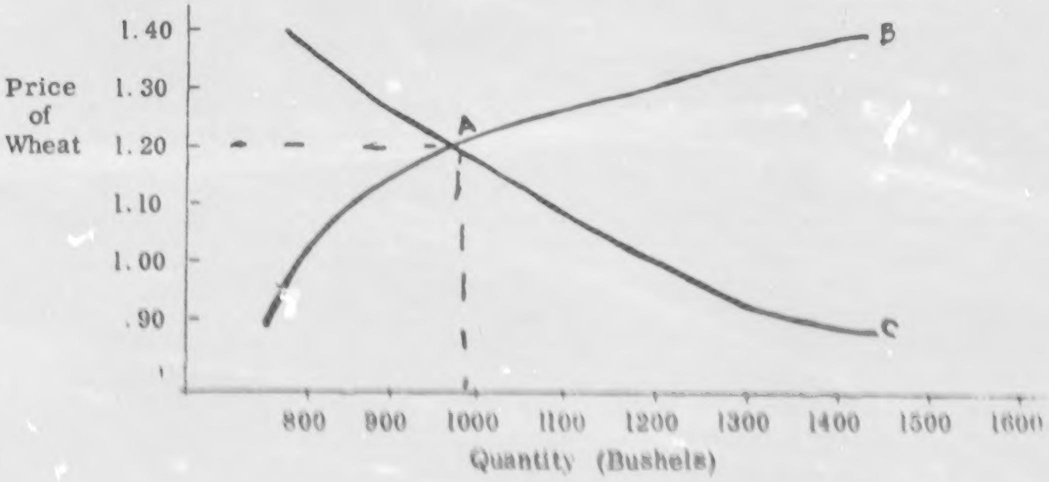
7. If a farmer wants to protect himself against a declining market price between the time he buys a product and sells it, he is engaged in

   A. futures contract
   B. mark up
   C. speculating
   D. insured buying

8. What would happen to the equilibrium price on the following chart if supply and demand increased equally?



   A. The price may remain the same
   B. The price will increase
   C. The price will decrease
   D. Lesser quantity to be sold

9. Which of the following is not a factor of production?

   A. Management
   B. Capital
   C. Net returns
   D. Labor

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10. Marketing of agricultural products is productive since

A. it does not cost much
B. it provides a variety of products for the housewife
C. it adds utility to a product
D. it subtracts from the consumer's dollar spent for food

11. Marketing costs account for what percent of the consumer's dollar spent for food?

A. 10%
B. 30%
C. 50%
D. 70%

12. If the price of soybeans is too high, the supply will be greater than the demand resulting in a

A. surplus
B. monopoly
C. shortage
D. slump

13. What happens to the price received and the quantity sold of an agricultural product when the demand increases and the supply remains the same?

A. An increased quantity is sold at a higher price
B. An increased quantity is sold at a lower price
C. A decreased quantity is sold at a higher price
D. A decreased quantity is sold at a lower price

14. The fact that farmers receive less of the food dollar spent by consumers is a sign of

A. inefficiencies in the marketing system
B. demand by consumers for more marketing services
C. government support prices
D. higher food prices than in previous years

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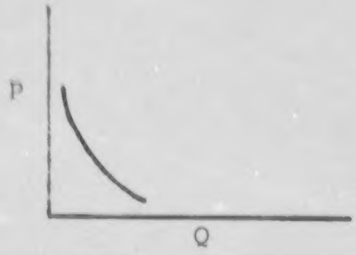
15. The diagram shown below represents which of the following curves?

A. A supply curve
B. An equilibrium curve
C. A demand curve
D. A unit elasticity curve



16. When two parties (institutions) come together with one wanting to sell something and one wanting to purchase something, what comes into existence?

A. A function
B. A wholesaler
C. A marketing channel
D. A market

17. Referring to the table below, what level of fertilizer application should the farmer use to maximize profits?

Quantity of Fertilizer Added	Total Yield	Cost of Added Fertilizer	Value of Added Yield
0#	60 bushels	$ -	$ -
10#	65 bushels	1.50	4.50
20#	68 bushels	1.50	2.70
30#	70 bushels	1.50	1.80
40#	71 bushels	1.50	.90

A. 10#
B. 20#
C. 30#
D. 40#

18. Referring to fixed costs and variable costs as they relate to the farm business, which of the following costs must be paid by the farmer even if nothing is produced?

A. Both variable and fixed costs
B. Variable cost
C. Fixed costs
D. Neither variable nor fixed costs

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19. If a farmer decided to expand his dairy herd, which of the following is a major problem most likely to be encountered?

A. Additional management problems with dairy herd
B. Shortage of labor during peak planting and harvesting periods
C. Obtaining additional roughage
D. Providing additional storage space for corn

20. A farmer's profit will be greatest if each unit of land, labor, and capital is used

A. in such a manner that it will add the most to gross returns of the farm business
B. on the enterprise in which the farmer has the greatest interest and ability
C. on the enterprises where he will realize the greatest yield per acre or animal unit
D. in such a manner that will add the most to net returns of the farm business

21. An approved practice for increasing the per acre yield of soybeans has been discovered and tested at the State Experimental Station. A farmer should adopt the new practice if

A. it will improve the quality of soybeans
B. it will increase soybean receipts more than expenses
C. it will increase the size or volume of the farm business
D. it will increase gross farm income

22. The normal seeding rate for barley is 90 lbs. per acre. Two fields with comparable capability and fertility levels are seeded to barley. Field "A" is seeded at the rate of 115 lbs. per acre and Field "B" is seeded at the rate of 140 lbs. per acre. Assuming that growing conditions were identical for each field, we might predict that the yield per acre of Field "B" would be

A. twice the yield of Field "A"
B. the same yield as Field "A"
C. less than the yield of Field "A"
D. more than the yield of Field "A"

23. It is profitable for a farmer to borrow money to expand his farm business when the borrowed money

A. returns more than the cost of borrowing money
B. can be secured at a low interest rate
C. can improve the level of production
D. will increase volume of business

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24. What is the annual depreciation of a moldboard plow purchased at a price of $1,250? This plow has an expected useful life of 10 years.

    A. $250
    B. $125
    C. $1,250
    D. Cannot be calculated from the given information

25. Which of the following is not a fixed cost in the use of a tractor?

    A. Insurance
    B. Depreciation
    C. Oil and grease
    D. Interest on borrowed money

26. Using straight line depreciation, what is the annual depreciation on a combine costing $20,000 with a $4,000 salvage value and an 8-year life?

    A. $2,500
    B. $4,000
    C. $2,000
    D. $3,000

27. Which of the following would be least apt to have a salvage value at the end of its useful life?

    A. Tractor kept for five years
    B. Complete confinement building for livestock after 20 years
    C. Dairy cow after three years
    D. Portable transformer after eight years

28. Which of the following situations would not merit using the additional first year depreciation?

    A. A farm that expected much lower income in the future
    B. A farm with extremely high income
    C. A farm with a new machine which is likely to be obsolete soon
    D. A farm with a net operating loss for the second year

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29. Which of the following capital purchases qualified for a full 7% investment credit?

A. Used grain bin
B. New tractor with 6-year life
C. Boar with expected 3-year life
D. New machinery shed

30. The income eligible for capital gain treatment on a tractor sold for $3,000 with an unrecovered cost of $2,000 is

A. $3,000
B. $2,000
C. $1,000
D. $5,000

31. Using the following information, what is the value of net farm income?

Cash receipts - $30,000
Depreciation - $ 8,000
Cash expenses - $20,000
Increase in inventory - $10,000
Capital investment - $ 7,000

A. $5,000
B. $12,000
C. $2,000
D. $10,000

32. For income tax a farmer has an option to

A. estimate income by January 15 and file the final return by March 1
B. make no estimate and file by February 15
C. make no estimate and file by March 1
D. estimate by January 30 and file final return by March 1

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33. Using the following information, what is the major problem with this farm operation?

Gross farm income -- $20,000
Overhead ratio -- 30%
Return to labor and management -- $6,000
Total farm investment -- $50,000

A. Overhead expenses too high
B. Investment too high
C. Low volume
D. Low efficiency

34. Using the following information, what is the cost of producing a bushel of corn if the corn yields 120 bushels per acre?

Price of corn -- $2.50 per bushel
Price of soybeans -- $6.50 per bushel
Cost of producing corn -- $200 per acre
Cost of producing soybeans -- $160 per acre

A. $1.67
B. $2.50
C. $1.80
D. $1.20

35. An example of an overhead cost is

A. hired labor
B. interest
C. machinery repairs
D. feed

36. Which of the following is a capital investment in farm accounting?

A. Dairy cow
B. Lease of a tractor
C. Steers
D. Propane for grain drier

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37. The purchase of a grain bin would be entered in which of the following expense columns in the farm account book?

A. Drying and storage
B. Crop supplies
C. Capital investment
D. Interest

38. The most important factor used by credit agencies in determining a person's credit ability is

A. assets
B. net worth
C. liabilities
D. value of land owned

39. A 1½% rate of interest per month is the same as paying an annual interest rate of

A. 12%
B. 15%
C. 18%
D. 24%

40. A young farmer has an investment of $100,000 in real estate which is covered by a mortgage of $80,000 outstanding. In the event of his death, what type of insurance would cover the cost of the mortgage?

A. Personal liability insurance
B. Credit mortgage insurance
C. Property damage insurance
D. Automobile insurance

41. What type of insurance does a farmer carry on buildings and farm machinery to cover loss from fire and theft?

A. Ordinary life insurance
B. Term insurance
C. Comprehensive property damage insurance
D. Disability insurance

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42. A farmer is not required to carry Workmen's Compensation Insurance if he employs

A. 1-3 employees
B. 3-5 employees
C. 5 or more employees
D. only employs his children

43. Workmen's Compensation Insurance is administered by

A. Local insurance agents
B. County Health Board
C. State of Ohio
D. Internal Revenue Service

END OF TEST

APPENDIX I

SCHOOLS IN WHICH INSTRUMENTS WERE FIELD TESTED

AREA VOCATIONAL CENTERS

Ashland County Area Vocational Center (Agribusiness Supplies and Services)
Ashtabula County Area Vocational Center (Agricultural Mechanics)
Belmont County Area Vocational Center (Agricultural Mechanics)
EHOVE Area Vocational Center (Agricultural Mechanics; Agribusiness Supplies and Services; Farm Management)
Four County Area Vocational Center (Agricultural Mechanics; Horticulture)
Great Oaks Area Vocational Center--Laurel Oaks (Agricultural Mechanics)
Greene County Area Vocational Center (Agricultural Mechanics)
Lorain County Area Vocational Center (Agribusiness Supplies and Services)
Mahoning County Area Vocational Center (Agricultural Mechanics; Horticulture)
Montgomery County Area Vocational Center (Agribusiness Supplies and Services; Farm Management)
Muskingum County Area Vocational Center (Agricultural Mechanics; Horticulture)
Penta County Area Vocational Center (Agricultural Mechanics; Horticulture)
Pioneer Area Vocational Center (Horticulture)
Vanguard Area Vocational Center (Agricultural Mechanics)
Washington County Area Vocational Center (Horticulture; Agribusiness Supplies and Services)
Wayne County Area Vocational Center (Agricultural Mechanics; Farm Management)

LOCAL SCHOOLS

Dalton High School--Wayne County (Farm Management)
Eaton High School--Preble County (Agribusiness Supplies and Services)
Evergreen Local High School--Fulton County (Agribusiness Supplies and Services)
Margaretta High School--Erie County (Farm Management)
Miami East High School--Miami County (Farm Management)
Newton High School--Miami County (Agribusiness Supplies and Services)
Triway Local High School--Wayne County (Farm Management)
Twin Valley South High School--Preble County (Farm Management)
Wauseon High School--Fulton County (Agribusiness Supplies and Services)
Western Reserve High School--Huron County (Farm Management)

APPENDIX J

TABLES

TABLE 1

ITEM ANALYSIS: FORM A--AGRICULTURAL MECHANICS MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-1					
1	C	.53	.16	.11	10.1
2	D	.03	.35	.27	9.5
3	C	.10	.50	.22	19.0
4	B	.03	.02	.07	0.4
5	A	.36	.34	.29	21.9
6	A	.32	.75	.44	48.0
7	C	.31	.60	.28	39.8
8	D	.06	.35	.20	9.5
9	C	.46	.54	.23	35.4
10	D	.20	.37	.28	20.3
11	A	.30	.73	.44	48.4
12	A	.22	.81	.52	52.4
13	B	.12	.50	.43	24.2
14	A	.31	—.03	.03	-1.9
15	A	.26	.89	.63	67.1
16	C	.05	.35	.12	9.5
17	D	.06	-.12	-.03	-3.9
18	B	.03	.25	.18	4.8
19	A	.38	.60	.34	39.8
20	B	.30	.61	.39	33.7
21	C	.44	.28	.17	18.0
22	C	.04	.16	.13	5.2
23	A	.23	.47	.23	24.6
24	C	.32	.55	.28	35.0
25	B	.53	.35	.11	23.2
26	D	.40	.41	.14	26.3
27	B	.53	.60	.35	41.0
28	C	.77	.37	.16	20.5
29	A	.83	.55	.29	30.0
30	B	.05	.43	.31	14.3
31	A	.42	.20	.11	12.8
32	D	.08	.14	.10	5.6
33	B	.13	.70	.41	38.1
34	A	.60	.54	.37	33.5
35	C	.16	.55	.22	23.8

TABLE 1--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-2					
1	B	.34	.05	.07	2.9
2	B	.40	.28	.24	17.6
3	C	.34	.28	.17	16.8
4	D	.49	.55	.27	36.6
5	A	.27	.48	.35	30.2
6	B	.49	.72	.40	50.5
7	C	.61	.11	.06	6.2
8	B	.05	.50	.34	19.0
9	D	.13	.43	.14	19.5
10	A	.51	.84	.52	64.0
11	D	.65	-.12	-.05	-8.1
12	B	.25	.81	.48	52.4
13	D	.52	.54	.31	35.8
14	B	.42	.41	.25	26.7
15	B	.62	.55	.31	36.6
16	A	.94	.22	.19	8.3
17	B	.73	.32	.16	16.6
18	A	.91	.40	.24	13.0
19	B	.56	.14	.15	8.9
20	C	.87	.17	.04	7.9
21	C	.40	.70	.31	49.7
22	C	.29	.75	.45	48.0
23	B	.65	.44	.18	28.4
24	D	.51	.54	.32	36.2
25	B	.90	.06	.10	3.1
26	C	.69	.68	.40	46.6
27	D	.75	.03	-.02	1.9
28	D	.73	.48	.28	29.2
29	C	.61	.66	.34	45.8
30	A	.43	.34	.26	22.4
31	B	.38	.12	.11	7.7
32	B	.22	.50	.34	29.8
33	B	.54	.43	.19	28.0
34	A	.71	.19	.15	11.0
35	C	.86	-.32	-.13	-15.1

TABLE 1--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-2					
36	B	.57	.16	.06	9.7
37	D	.74	-.03	-.10	-1.7
38	D	.58	.14	.13	9.3
39	C	.52	.48	.27	31.9
40	A	.36	.80	.48	58.4
41	B	.03	.02	.02	0.4
42	D	.32	.54	.28	35.4
43	B	.52	.41	.26	26.7
44	A	.51	.72	.36	48.9
45	C	.66	-.20	-.09	-12.0
46	C	.31	.61	.33	39.3
47	D	.78	.20	.21	11.4
48	D	.22	.75	.52	48.0
49	D	.70	-.20	-.11	-11.6
50	D	.64	.09	.06	5.8
51	C	.23	.56	.32	34.6
52	D	.90	-.35	-.21	-9.5
53	A	.35	.61	.33	39.3
54	C	.62	.08	.05	5.4
55	B	.54	.61	.28	41.4
56	C	.31	.41	.13	26.3
57	B	.71	.23	.06	11.8
58	B	.73	.40	.14	20.9
59	D	.44	.75	.47	54.0
60	C	.54	.43	.29	28.0
61	B	.10	.55	.39	23.8
62	A	.61	.77	.41	55.3
63	A	.56	.55	.37	37.1
64	B	.44	.75	.37	54.0
65	C	.20	.29	.25	15.5
66	A	.91	.12	.05	3.9
67	C	.21	.37	.28	20.3

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[a] Percentage of students missing the item

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score; and the lower group (bottom 27.5 per cent of students based on total score).

Footnotes continued

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 2

ITEM ANALYSIS: FORM B--AGRICULTURAL MECHANICS MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form B-1					
1	D	.69	.32	.21	20.2
2	B	.62	.54	.31	32.0
3	D	.20	.45	.13	23.2
4	B	.67	.57	.27	39.0
5	D	.20	.76	.54	47.1
6	C	.36	.06	.06	3.7
7	D	.60	.14	.00	8.5
8	A	.67	.57	.35	39.0
9	D	.51	.14	.14	8.8
10	C	.20	.71	.35	41.2
11	C	.34	.06	.11	3.7
12	B	.09	.38	.09	11.8
13	D	.40	.17	.17	10.3
14	B	.74	.69	.36	37.5
15	C	.44	.34	.25	21.7
16	B	.42	.74	.42	52.2
17	D	.38	.60	.33	39.7
18	A	.25	.66	.47	40.8
19	B	.53	.57	.41	39.3
20	D	.27	.35	.26	22.1
21	A	.14	.66	.48	35.3
22	C	.22	.48	.42	28.7
23	B	.47	.68	.42	46.3
24	C	.29	.76	.47	47.1
25	A	.34	.48	.27	28.7
26	A	.38	.77	.42	52.6
27	B	.16	.37	.19	17.3
28	D	.10	.60	.50	29.4
29	C	.71	-.17	-.05	-10.3
30	A	.56	.49	.25	32.7
31	D	.54	.49	.33	32.7
32	A	.11	.54	.40	23.5
33	C	.44	.66	.34	45.6
34	C	.16	.66	.52	35.3
35	C	.54	.49	.21	33.5

TABLE 2--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form B-2					
1	B	.45	.34	.23	21.7
2	B	.20	.11	.13	5.1
3	A	.85	.31	.19	12.9
4	A	.33	.62	.42	40.4
5	D	.53	.59	.24	39.7
6	B	.14	.32	.40	16.9
7	B	.38	.35	.28	22.1
8	C	.18	.54	.42	29.0
9	C	.87	.02	.00	1.1
10	B	.40	.79	.51	57.7
11	A	.67	.41	.31	26.8
12	A	.36	.89	.58	69.9
13	A	.69	.81	.40	56.6
14	C	.24	-.01	.03	- 1.1
15	B	.23	.71	.45	41.2
16	D	.05	.38	.32	11.8
17	A	.54	.32	.18	21.0
18	A	.76	.02	.02	.7
19	A	.56	.59	.31	38.6
20	B	.90	.02	.07	.4
21	C	.29	.60	.45	40.1
22	A	.25	.19	.20	10.7
23	D	.40	.90	.52	70.2
24	A	.13	.37	.35	17.3
25	C	.40	.66	.36	46.0
26	D	.45	.43	.25	27.6
27	B	.56	-.05	-.05	- 2.9
28	C	.20	.71	.52	41.2
29	B	.20	.66	.47	35.3
30	B	.22	.71	.43	41.2
31	C	.45	.14	.07	9.2
32	B	.31	.37	.22	22.4
33	C	.73	.23	.18	14.0
34	B	.18	.66	.44	35.3
35	C	.60	-.16	.03	- 9.9
36	D	.65	.43	.21	26.1
37	C	.14	.22	.22	11.0
38	A	.89	.19	.07	6.6
39	B	.54	.14	.08	8.8
40	A	.42	.84	.53	64.0

TABLE 2--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
41	C	.64	.14	.14	8.8
42	C	.65	-.17	-.17	-10.3
43	A	.40	.73	.45	51.8
44	B	.29	.17	.12	10.3
45	B	.33	.60	.43	40.1
46	B	.20	.54	.32	23.5
47	C	.18	.71	.56	41.2
48	A	.62	.65	.30	45.2
49	D	.94	.00	.08	0.00
50	C	.16	.60	.42	29.4
51	C	.34	.74	.49	52.2
52	D	.74	.54	.26	32.0
53	C	.49	.32	.20	21.0
54	D	.76	.25	.04	13.6
55	A	.73	.57	.25	32.0
56	B	.58	.23	.11	14.3
57	B	.56	.32	.04	20.6
58	A	.20	.41	.40	21.8
59	A	.33	.82	.45	58.5
60	D	.56	.66	.34	44.9
61	A	.56	.42	.19	26.5
62	A	.44	.43	.29	27.6
63	A	.33	.62	.43	40.4

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 3

ITEM ANALYSIS: FORM C--AGRICULTURAL MECHANICS MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form C-1					
1	D	.04	.32	.15	8.3
2	D	.65	.76	.44	53.2
3	A	.78	-.03	-.01	- 1.9
4	A	.76	.48	.24	29.5
5	C	.22	.55	.38	34.6
6	A	.80	.25	.02	14.1
7	C	.43	.64	.40	43.6
8	C	.43	.31	.13	19.9
9	C	.17	.59	.25	34.0
10	A	.83	.12	.15	6.4
11	A	.09	.47	.19	16.7
12	C	.91	.00	.08	00.0
13	B	.39	.31	.15	18.6
14	B	.11	.65	.37	33.3
15	D	.06	.47	.29	16.7
16	A	1.00	.00	.00	00.0
17	D	.63	.22	.18	13.5
18	C	.02	.32	.18	8.3
19	B	.06	.22	.21	9.0
20	A	.17	.56	.26	25.0
21	A	.11	.65	.47	33.3
22	B	.02	.32	.14	8.3
23	D	.04	.32	.18	8.3
24	B	.39	.64	.37	44.2
25	A	.13	.56	.31	25.0
26	D	.46	.31	.17	19.2
27	C	.19	.59	.23	34.0
28	C	.37	.65	.36	42.9
29	A	.89	-.56	-.34	-25.0
30	C	.02	.32	.32	8.3
31	C	.19	-.12	.00	- 6.4
32	B	.74	.31	.14	14.7
33	A	.24	.43	.20	26.9
34	C	.02	.32	.32	8.3
35	A	.48	-.08	.02	- 4.5

TABLE 3--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form C-2					
1	C	.17	.37	.18	17.3
2	C	.37	.17	.13	10.3
3	A	.52	.32	.02	20.5
4	B	.24	.44	.33	26.3
5	D	.19	-.31	-.21	-14.7
6	D	.11	.22	.07	9.0
7	A	.39	.43	.23	26.9
8	D	.41	.06	.11	3.8
9	D	.28	.67	.36	42.3
10	C	.61	.20	.16	12.8
11	B	.54	.54	.32	35.9
12	B	.33	-.08	-.02	- 4.5
13	A	.30	.90	.51	67.3
14	C	.24	.31	.26	18.3
15	B	.30	.43	.18	27.6
16	C	.63	.48	.25	29.5
17	C	.78	-.32	-.16	-17.9
18	B	.56	.20	.09	12.8
19	C	.19	-.12	-.12	- 6.4
20	C	.00	.00	.00	00.0
21	C	.56	-.55	-.20	- 34.6
22	A	.08	.47	.24	16.7
23	B	.54	.88	.43	67.3
24	C	.26	.37	.23	17.3
25	A	.28	.79	.37	50.0
26	C	.59	-.06	-.04	- 3.8
27	C	.74	-.19	-.06	- 9.6
28	C	.61	.66	.33	44.9
29	A	.72	.34	.27	21.2
30	C	.69	-.71	-.34	-50.0
31	C	.87	-.65	-.33	-33.3
32	B	.30	.67	-.36	-42.3
33	C	.06	.02	.04	00.6
34	A	.56	.81	.48	60.3
35	D	.52	.44	.24	28.8
36	B	.35	.75	.49	50.6
37	C	.48	.31	.21	19.2
38	A	.50	.82	.46	59.0
39	A	.43	.73	.44	51.3
40	A	.83	-.65	-.32	-33.3

TABLE 3--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
41	B	.30	.75	.49	50.6
42	C	.28	.67	.39	42.3
43	D	.30	.82	.54	59.0
44	A	.59	.66	.23	44.9
45	A	.50	.66	.55	41.9
46	A	.13	.65	.40	33.3
47	A	.06	.22	.17	9.0
48	C	.02	.00	-.03	00.0
49	C	.11	.65	.38	33.3
50	C	.61	.55	.24	36.5
51	A	.74	.48	.17	29.5
52	D	.67	.20	.01	12.8
53	B	.37	.17	.07	10.9
54	B	.43	.32	.26	20.5
55	C	.11	.02	.04	00.6
56	B	.39	.54	.31	35.9
57	B	.28	.75	.48	50.6
58	A	.06	.32	.06	8.3
59	A	.93	.43	.19	15.4
60	B	.69	-.17	-.15	-10.9
61	B	.30	-.09	.00	- 5.8
62	C	.83	.17	.04	7.1
63	A	.78	.25	.09	14.1
64	A	.74	.34	.16	21.2
65	D	.56	.54	.28	35.9
66	C	.80	-.03	.02	- 1.9
67	A	.89	.17	.05	7.1

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score.)

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 4

ITEM ANALYSIS: FORM AB-1 HORTICULTURE MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-1					
1	B	.72	.22	.06	11.9
2	D	.96	.00	-.09	00.0
3	A	.88	.22	.12	11.9
4	B	.12	.80	.56	50.0
5	C	.76	.22	.03	11.9
6	C	.72	.16	.29	9.5
7	C	.08	.00	.09	00.0
8	A	.88	-.05	.03	- 2.4
9	B	.76	.83	.48	57.1
10	B	.12	.66	.36	33.3
11	D	.16	.58	.23	35.7
12	C	.48	.56	.26	38.1
13	C	.00	.00	.00	00.0
14	D	.80	.72	.24	42.9
15	D	.24	.35	.18	19.0
16	A	.68	.83	.47	57.1
17	A	.60	.56	.37	38.1
18	B	.00	.00	.00	00.0
19	A	.72	.60	.38	40.5
20	C	.00	.00	.00	00.0
21	B	.40	.35	.35	19.0
22	D	.64	.76	.28	54.8
23	B	.08	.66	.19	33.3
24	A	.72	.60	.52	40.5
25	D	.52	.56	.35	38.1
26	B	.28	.58	.23	35.7
27	A	.16	.08	-.11	4.8
28	D	.40	.58	.35	35.7
29	B	.60	.56	.47	38.1
30	D	.52	.56	.38	38.1
31	B	.28	.35	.32	19.0
32	B	.52	-.16	.14	- 9.5
33	C	.56	.37	.22	23.8
34	A	.40	.37	.20	23.8
35	C	.92	.58	.37	28.6

TABLE 4--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	B	.20	-.72	-.40	-42.9
37	A	.80	.83	.31	57.1
38	A	.56	-.11	.12	- 7.1
39	A	.80	.43	.50	26.2
40	C	.08	.66	.44	33.3
41	A	.48	.35	.33	19.0
42	D	.08	.47	.26	16.7
43	C	.68	.43	.37	26.2
Form B-1					
1	B	.68	-.08	.11	- 4.8
2	C	.88	.58	.43	28.6
3	C	.80	.83	.59	57.1
4	B	.88	.58	.40	28.6
5	B	.68	.16	.27	9.5
6	C	.64	.11	.27	7.1
7	C	.76	.43	.45	26.2
8	B	.36	-.72	-.12	- 42.9
9	C	.56	.34	.34	21.4
10	A	.72	.58	.32	28.6
11	B	.60	.37	.30	23.8
12	A	.20	.66	.24	33.3
13	B	.64	.58	.07	28.6
14	A	.44	.76	.31	54.8
15	B	.48	-.08	-.12	- 4.8
16	C	.96	.00	-.09	00.0
17	D	.52	-.11	.04	- 7.1
18	D	.28	.90	.48	66.7
19	C	.72	.43	.18	26.2
20	B	.44	.98	.59	85.7
21	C	.24	.58	.40	35.7
22	A	.56	.37	.22	23.8
23	B	.76	.41	-.01	14.3
24	A	.36	.58	.41	35.7
25	C	.84	.22	.25	11.9
26	A	.32	.75	.46	52.4
27	C	.64	.16	.14	9.5
28	B	.76	.91	.73	71.4
29	C	.64	.60	.46	40.5
30	C	.52	.76	.35	54.8

TABLE 4--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
31	B	.56	.22	.27	11.9
32	A	.72	.83	.31	57.1
33	B	52	.34	.44	21.4
34	B	92	.41	.28	14.3
35	C	.40	.11	-.05	7.1
36	A	.52	.00	.71	100.0
37	C	.44	.56	.48	38.1
38	B	.52	.97	.59	83.3
39	B	.88	-.35	.06	- 19.0
40	B	.52	.37	-.10	23.8
41	B	.60	.37	.47	23.8
42	D	.24	-.22	-.06	- 11.9
43	B	.68	.91	.57	71.4
44	C	.72	-.47	-.24	- 16.7
45	C	.36	.34	.32	21.4
46	A	.92	-.47	-.18	- 16.7
47	B	.60	.60	.33	40.5
48	A	.68	.75	.56	52.4
49	B	.72	-.08	.09	- 4.8
50	A	.80	-.05	-.09	- 2.4
51	B	.64	.60	.27	40.5
52	B	.48	.98	.53	85.7
53	A	.68	.43	.17	26.2
54	B	.84	.22	.16	11.9
55	C	.72	.83	.43	57.1
56	B	.52	.60	.20	40.5
57	A	.36	.35	.14	19.0
58	A	.44	.58	.43	35.7
59	D	.88	.41	.03	14.3
60	C	.72	.43	.18	26.2
61	C	.68	-.11	-.03	- 7.1
62	C	.52	.37	.30	23.8
63	D	.32	.80	.43	50.0
64	C	.44	.11	.07	7.1
65	C	.68	-.58	-.36	- 35.7
66	B	.36	.37	.25	23.8
67	C	.76	.43	.36	26.2
68	A	.36	.75	.34	52.4
69	B	1.00	.00	.00	00.0
70	D	.92	.00	-.09	00.0

TABLE 4--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
71	A	.72	.43	.35	26.2
72	D	.56	.98	.58	85.7
73	D	.68	.60	.34	40.5
74	D	.60	.00	.70	100.0
75	B	.80	.43	.42	26.2
76	B	.72	.72	.40	42.9

[a] Percentage of students missing the item

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 5

ITEM ANALYSIS: FORM AB-2 HORTICULTURE MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-2					
1	C	.05	.00	.07	00.0
2	B	.10	.00	.12	00.0
3	A	.65	.00	.05	00.0
4	B	.05	.00	-.05	00.0
5	B	.50	.31	.13	20.0
6	D	1.00	.00	.00	00.0
7	C	.55	.00	.22	00.0
8	A	.70	.85	.57	60.0
9	B	.15	.50	.24	20.0
10	D	.75	.34	.22	20.0
11	C	.50	.34	.27	20.0
12	C	.25	.34	.19	20.0
13	A	.55	.31	.10	20.0
14	A	.55	.96	.58	80.0
15	B	.20	.71	.51	40.0
16	B	.10	.00	.09	00.0
17	A	.25	.71	.36	40.0
18	D	.00	.00	.00	00.0
19	B	.50	.00	.06	00.0
20	A	.50	-.34	-.20	-20.0
21	B	.00	.00	.00	00.0
22	A	.45	.60	.27	40.0
23	D	.30	.34	.14	20.0
24	C	.75	.71	.43	40.0
25	B	.75	.60	.43	40.0
26	C	.55	.31	.13	20.0
27	C	.25	.96	.59	80.0
28	C	.55	.00	.13	00.0
29	A	.40	.85	.47	60.0
30	A	.35	.81	.47	60.0
31	A	.20	.50	.21	20.0
32	A	.30	.00	-.01	00.0
33	A	.90	.00	-.07	00.0
34	C	.75	.34	.26	20.0
35	A	.55	.00	.10	00.0

TABLE 5--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	D	.10	.00	-.02	00.0
37	B	.05	.50	.19	20.0
38	A	.15	.00	.07	00.0
39	B	.50	.60	.16	40.0
40	D	.55	.81	.51	60.0
41	A	.10	-.50	-.16	-20.0
42	C	.25	.50	.20	20.0
43	D	.30	.96	.53	80.0
Form B-2					
1	D	.45	.85	.23	60.0
2	B	.40	.34	.10	20.0
3	C	.45	.00	.68	100.0
4	B	.45	-.31	-.13	-20.0
5	A	.65	.81	.50	60.0
6	A	.45	.85	.50	60.0
7	A	.80	.00	-.01	00.0
8	D	.45	.71	.29	40.0
9	C	.85	.50	.34	20.0
10	B	.50	.85	.41	60.0
11	D	.80	.00	-.01	00.0
12	B	.80	.00	.05	00.0
13	B	.80	.00	-.09	00.0
14	B	.35	.85	.48	60.0
15	C	.40	.96	.62	80.0
16	B	.55	.00	.05	00.0
17	A	.60	.96	.63	80.0
18	D	.55	.00	-.01	00.0
19	B	.25	.85	.43	60.0
20	B	.40	.60	.41	40.0
21	C	.70	.00	.03	00.0
22	C	.65	.85	.45	60.0
23	B	.55	.00	.63	100.0
24	A	.55	.60	.30	40.0
25	D	.95	.00	-.16	00.0
26	C	.65	-.50	-.14	-20.0
27	A	.70	.81	.47	60.0
28	B	.75	.85	.51	60.0
29	B	.60	.00	.01	00.0
30	C	.55	.00	.67	100.0

TABLE 5--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
31	D	.45	.96	.50	80.0
32	D	.70	.31	.36	20.0
33	D	.85	-.85	-.45	-60.0
34	B	.75	.00	.08	00.0
35	C	.30	.85	.54	60.0
36	B	.65	.96	.59	80.0
37	B	.70	-.71	-.30	-40.0
38	B	.50	-.31	-.08	-20.0
39	A	.55	.00	.78	100.0
40	B	.25	.71	.35	40.0
41	A	.80	.00	-.06	00.0
42	D	.60	.00	.69	100.0
43	B	.80	.60	.52	40.0
44	B	.50	.00	.62	100.0
45	B	.50	.81	.39	60.0
46	B	.60	.31	.31	20.0
47	C	.45	.00	.74	100.0
48	D	.60	.96	.67	80.0
49	A	.55	.60	.18	40.0
50	C	.75	.00	-.09	00.0
51	B	.80	.50	.31	20.0
52	D	.70	-.71	-.32	-40.0
53	A	.65	.00	.72	100.0
54	C	.45	.60	.34	40.0
55	A	.85	.50	.28	20.0
56	A	.65	.96	.62	80.0
57	A	.35	.71	.39	40.0
58	A	.60	.96	.55	80.0
59	D	.60	.00	.73	100.0
60	D	.85	.00	-.12	00.0
61	A	.40	.96	.67	80.0
62	B	.70	.85	.41	60.0
63	C	.40	.96	.60	80.0
64	D	.35	.81	.36	60.0
65	D	.65	.00	-.02	00.0
66	A	.60	.60	.42	40.0
67	B	.45	.00	.03	00.0
68	D	.55	.96	.60	80.0
69	A	.75	.60	.39	40.0
70	C	.50	.31	.16	20.0

TABLE 5--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
71	A	.80	.34	.16	20.0
72	B	.80	.60	.32	40.0
73	A	.50	.96	.64	80.0
74	C	.55	-.34	-.01	-20.0
75	A	.65	.34	.14	20.0
76	B	.80	.85	.48	60.0

[a] Percentage of students missing the item

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 6

ITEM ANALYSIS: FORM AB-3 HORTICULTURE MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
Form A-3					
1	B	.55	.60	.39	40.0
2	B	.65	.00	.10	00.0
3	A	.60	.31	.09	20.0
4	C	.60	.31	.24	20.0
5	A	.60	.00	.08	00.0
6	D	.45	.96	.55	80.0
7	A	.60	.60	.33	40.0
8	A	.45	.34	.28	20.0
9	A	.85	.00	.07	00.0
10	A	.65	.96	.48	80.0
11	B	.20	.50	.14	20.0
12	A	.60	.81	.35	60.0
13	C	.25	.71	.33	40.0
14	A	.45	.96	.56	80.0
15	D	.55	.31	.16	20.0
16	C	.70	.71	.19	40.0
17	B	1.00	.00	.00	00.0
18	A	.65	-.50	-.24	-20.0
19	B	.70	-.34	-.10	-20.0
20	B	.40	.00	.10	00.0
21	C	.60	.34	.14	20.0
22	B	.75	.50	.05	20.0
23	A	.75	.34	.00	20.0
24	C	.40	-.31	.04	-20.0
25	B	.55	.85	.43	60.0
26	D	.40	.85	.42	60.0
27	D	.70	-.31	-.18	-20.0
28	B	.30	.34	.37	20.0
29	C	.80	.85	.62	60.0
30	C	.65	.85	.38	60.0
31	A	.90	.00	.14	00.0
32	D	.30	.71	.13	40.0
33	A	.20	.34	.16	20.0
34	A	.90	.00	.17	20.0
35	B	.10	.50	.21	20.0

TABLE 6--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	A	.20	.71	.37	40.0
37	B	.25	.71	.45	40.0
38	C	.15	.50	.32	20.0
39	C	.65	.50	.01	20.0
40	C	.50	.31	.16	20.0
Form B-3					
1	C	.25	.85	.44	60.0
2	B	.55	.85	.34	60.0
3	B	.90	-.50	-.10	-20.0
4	B	.40	.34	.08	20.0
5	B	.60	.34	.22	20.0
6	A	.30	.81	.60	60.0
7	B	.70	.00	-.16	00.0
8	A	.55	.96	.70	80.0
9	C	.65	.60	.38	40.0
10	A	.90	.50	.18	20.0
11	C	.65	.71	.40	40.0
12	C	.55	.00	-.05	00.0
13	A	.50	.96	.60	80.0
14	C	.60	.85	.43	60.0
15	B	.95	.00	.10	00.0
16	A	.45	.60	.28	40.0
17	B	.35	.85	.43	60.0
18	A	.60	.60	.28	40.0
19	C	.75	.34	.13	20.0
20	C	.70	.60	.20	40.0
21	C	.85	-.50	-.05	-20.0
22	B	.40	.34	.26	20.0
23	A	.65	-.34	-.21	-20.0
24	D	.40	-.81	-.19	-60.0
25	A	.50	.31	.06	20.0
26	C	.75	.85	.40	60.0
27	A	.25	.60	.29	40.0
28	C	.25	.71	.31	40.0
29	B	.50	.34	.12	20.0
30	D	.20	.71	.44	40.0

TABLE 6--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
31	C	.55	.60	.37	40.0
32	D	.25	.50	.29	20.0
33	B	.65	.85	.47	60.0
34	D	.50	.60	.38	40.0
35	A	.45	.96	.45	80.0
36	D	.45	.60	.16	40.0
37	C	.80	-.71	-.34	-40.0
38	B	.45	.81	.50	60.0
39	B	.45	.85	.28	60.0
40	C	.95	-.50	-.38	-20.0
41	C	.65	.31	.37	20.0
42	D	.15	.71	.34	40.0
43	D	.45	.96	.58	80.0
44	C	.45	.34	.24	20.0
45	C	.25	.96	.61	80.0
46	D	.35	.96	.54	80.0
47	B	.80	.00	.21	00.0
48	B	.25	.71	.38	40.0
49	D	.65	.60	.27	40.0
50	C	.40	.85	.54	60.0
51	D	.60	-.96	-.45	-80.0
52	C	.65	.34	.36	20.0
53	A	.45	.96	.61	80.0
54	B	.80	.34	.15	20.0
55	C	.65	.34	.22	20.0
56	B	.75	.50	.23	20.0
57	C	.70	-.50	-.09	-20.0
58	C	.45	.81	.49	60.0
59	D	.70	.60	.27	40.0
60	A	.80	.71	.50	40.0
61	B	.80	.71	.28	40.0
62	A	.55	.31	.22	20.0
63	A	.75	-.71	-.35	-40.0
64	B	.30	.85	.40	60.0
65	D	.45	.96	.50	80.0
66	B	.85	.50	.33	20.0
67	B	.75	.00	.00	00.0
68	C	.75	-.34	-.12	-20.0
69	D	.80	.34	.22	20.0
70	C	.70	.34	.14	20.0

TABLE 6--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
71	B	.40	.34	.15	20.0
72	D	.60	.96	.61	80.0
73	A	.85	.00	.03	00.0
74	D	.55	.60	.44	40.0
75	B	.70	-.60	-.16	-40.0
76	D	.75	.50	.11	20.0

[a] Percentage of students missing the item

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 7

ITEM ANALYSIS: FORM A--AGRIBUSINESS SUPPLIES AND SERVICES

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	C	.0	.0	.0	00.0
2	D	.18	.60	.50	30.8
3	C	.24	.74	.42	46.2
4	D	.20	.67	.55	44.8
5	C	.89	.05	.04	1.4
6	C	.80	.52	.19	28.7
7	B	.49	.26	.25	17.5
8	C	.78	.77	.36	45.5
9	C	.73	-.40	-.09	-20.3
10	D	.11	.52	.24	23.1
11	D	.20	.67	.37	38.5
12	D	.67	-.03	-.17	-2.1
13	D	.20	.45	.44	28.0
14	B	.33	.55	.39	35.7
15	A	.27	.55	.41	35.7
16	D	.62	.60	.23	39.2
17	D	.24	.67	.46	44.8
18	A	.22	.09	.11	4.9
19	A	.18	.60	.36	30.8
20	B	.64	.09	.11	5.6
21	D	.51	.23	.24	14.7
22	D	.87	.25	.02	10.5
23	C	.60	.26	.02	17.5
24	D	.13	.67	.68	38.5
25	D	.07	.29	.15	7.7
26	A	.20	.51	.54	29.4
27	D	.22	.51	.46	29.4
28	C	.49	-.11	.07	-7.0
29	C	.84	-.22	-.26	-12.6
30	D	.49	.71	.42	49.7
31	C	.58	.60	.35	40.6
32	B	.87	.25	-.06	10.5
33	C	.80	.08	.03	4.2
34	C	.73	.08	-.04	4.2
35	A	.71	.63	.26	37.8

TABLE 7--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	B	.64	-.19	-.08	-11.2
37	A	.78	.06	.14	2.8
38	B	.82	.50	.24	18.2
39	D	.42	.80	.54	58.7
40	A	.82	.40	.05	19.6
41	D	.47	.72	.26	51.0
42	C	.58	.38	.09	25.2
43	D	.84	.40	.20	19.6
44	B	.33	.55	.35	35.7
45	C	.40	.06	.02	3.5
46	B	.31	.60	.33	37.1
47	D	.36	.13	.23	8.4
48	B	.62	.37	.32	21.0
49	D	.40	.61	.40	42.0
50	A	.67	.60	.40	39.2

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on the total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 8

ITEM ANALYSIS: FORM B--AGRIBUSINESS SUPPLIES AND SERVICES

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	D	.28	.00	.01	00.0
2	B	.25	.74	.24	44.4
3	A	.94	-.37	-.15	- 11.1
4	D	.25	.19	.34	11.1
5	C	.69	.00	.06	00.0
6	D	.47	.50	.25	33.3
7	D	.28	.37	.30	22.2
8	B	.25	.65	.19	33.3
9	D	.53	.83	.47	55.6
10	A	.03	.37	.53	11.1
11	A	.41	.65	.31	44.4
12	D	.38	.78	.47	55.6
13	C	.47	-.50	-.25	-33.3
14	A	.41	.65	.37	44.4
15	B	.09	.65	.52	33.3
16	B	.34	.37	.29	22.2
17	A	.06	.37	.43	11.1
18	A	.75	.37	.16	22.2
19	A	.28	.90	.55	66.7
20	A	.03	.37	.17	11.1
21	D	.78	.41	.20	22.2
22	D	.75	.19	.03	11.1
23	B	.25	.55	.24	33.3
24	B	.31	.67	.33	44.4
25	B	.28	.67	.35	44.4
26	D	.41	.00	.07	00.0
27	A	.16	.83	.67	55.6
28	B	.81	-.19	-.02	- 11.1
29	B	.38	.34	.26	22.2
30	D	.56	.65	.42	44.4
31	C	.28	.67	.43	44.4
32	A	.22	.23	.27	11.1
33	D	.66	-.37	.10	-22.2
34	A	.25	.67	.41	44.4
35	A	.38	.78	.37	55.6

TABLE 8--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	A	.47	.51	.34	33.3
37	A	.06	.37	.10	11.1
38	B	.69	.19	.00	11.1
39	C	.28	.00	-.09	00.0
40	B	.59	.78	.46	55.6
41	D	.75	.23	.20	11.1
42	D	.81	-.19	-.23	- 11.1
43	C	.88	.00	.07	00.0
44	D	.16	.65	.51	33.3
45	D	.38	.90	.50	66.7
46	C	.25	.74	.36	44.4
47	B	.53	.17	.08	11.1
48	C	.47	.65	.36	44.4
49	D	.38	.67	.46	44.4
50	A	.47	.77	.37	55.6

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 9

ITEM ANALYSIS: FORM C--AGRIBUSINESS SUPPLIES AND SERVICES

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	A	.32	.77	.41	50.0
2	D	.16	.67	.50	37.5
3	D	.87	-.20	-.15	-10.7
4	B	.45	.66	.42	46.4
5	D	.19	.20	.02	10.7
6	B	.84	-.38	-.06	-12.5
7	A	.42	-.29	-.04	-17.9
8	D	.71	.08	.16	5.4
9	C	.55	.29	.09	17.9
10	D	.03	.38	.50	12.5
11	B	.23	.67	.34	37.5
12	D	.13	.20	.21	10.7
13	A	.13	-.05	-.06	- 1.8
14	A	.07	.55	.40	25.0
15	A	.36	.51	.32	33.9
16	D	.29	.77	.32	50.0
17	A	.26	.56	.20	35.7
18	B	.13	.20	.36	10.7
19	A	.74	.61	.24	28.6
20	A	.07	.38	.30	12.5
21	B	.61	-.14	-.20	- 8.9
22	A	.84	-.38	-.17	-12.5
23	C	.07	.55	.48	25.0
24	C	.39	.98	.53	87.5
25	D	.10	.55	.33	25.0
26	B	.16	-.05	.08	- 1.8
27	A	.71	.50	.32	32.1
28	D	.36	.67	.29	37.5
29	A	.84	.05	-.06	1.8
30	D	.77	.29	.06	17.9
31	A	.80	.06	.01	3.6
32	D	.07	.38	.40	12.5
33	A	.16	.38	.11	12.5
34	B	.58	.66	.26	46.4
35	C	.77	.74	.46	42.9

TABLE 9--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	B	.48	.31	.33	19.6
37	B	.36	.93	.49	75.0
38	A	.45	.81	.54	58.9
39	B	.42	.66	.34	46.4
40	D	.45	.34	.17	21.4
41	B	.26	.34	.36	21.4
42	D	.52	-.08	-.03	- 5.4
43	B	.16	.20	.15	10.7
44	C	.10	-.05	.09	- 1.8
45	A	.07	.55	.25	25.0
46	B	.52	.91	.54	73.2
47	C	.55	.50	.34	32.1
48	B	.58	.51	.42	30.4
49	A	.55	.81	.46	58.9
50	A	.68	.81	.25	58.9

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[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 10

ITEM ANALYSIS: FORM A--FARM MANAGEMENT MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	D	.35	.60	.31	40.0
2	B	.75	.34	.05	20.0
3	D	.90	.49	.15	20.0
4	C	.75	.85	.45	60.0
5	A	.20	.85	.52	60.0
6	B	.55	.81	.45	60.0
7	B	.45	.60	.15	40.0
8	A	.70	.85	.54	60.0
9	C	.50	.85	.43	60.0
10	B	.90	.49	.39	20.0
11	D	.30	.81	.40	60.0
12	B	.70	.34	.38	20.0
13	A	.45	.00	-.06	00.0
14	C	.30	.34	.19	20.0
15	A	.50	.81	.25	60.0
16	A	.85	.49	.19	20.0
17	B	.60	.60	.35	40.0
18	A	.85	-.49	-.15	-20.0
19	C	.70	-.34	-.31	-20.0
20	C	.55	.60	.26	40.0
21	C	.15	.50	.27	20.0
22	B	.80	-.34	-.13	-20.0
23	C	.20	.71	.41	40.0
24	B	.45	.60	.37	40.0
25	A	.70	.34	.16	20.0
26	B	.35	.34	.12	20.0
27	B	1.00	.00	.00	00.0
28	A	.55	-.31	.12	-20.0
29	A	.65	.31	.29	20.0
30	C	.80	.00	.20	00.0
31	B	.80	.34	-.08	20.0
32	B	.85	.71	.65	40.0
33	C	.40	.71	.40	40.0
34	B	.80	.49	.30	20.0
35	D	.55	.31	.06	20.0

TABLE 10--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	A	.65	.34	.31	20.0
37	C	.40	.60	.43	40.0
38	B	.30	.85	.51	60.0
39	B	.50	.31	.18	20.0
40	C	.20	-.34	.13	-20.0
41	C	.80	.85	.61	60.0
42	D	.45	.00	.70	100.0

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students, based on total score).

TABLE 11

ITEM ANALYSIS: FORM B--FARM MANAGEMENT MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	D	.90	.65	.24	33.3
2	C	.67	.72	.42	50.0
3	C	.76	-.65	-.22	-33.3
4	C	.29	.79	.35	50.0
5	C	.57	.49	.16	33.3
6	C	.76	.29	.08	16.7
7	D	.86	.65	.50	33.3
8	B	.43	.26	.33	16.7
9	A	.71	.29	.10	16.7
10	D	.57	.00	.08	00.0
11	D	.52	.72	.43	50.0
12	D	.43	.72	.39	50.0
13	C	.71	.00	.24	00.0
14	D	.52	.49	.31	33.3
15	D	.52	.72	.37	50.0
16	A	.81	.29	.10	16.7
17	B	.71	.52	.33	33.3
18	C	.67	.79	.31	50.0
19	B	.71	.79	.28	50.0
20[e]	---	---	---	---	----
21	C	.71	.90	.61	66.7
22	D	.33	.72	.38	50.0
23	A	.81	-.45	-.10	-16.7
24	D	.81	.00	.15	00.0
25	A	.86	.65	.53	33.3
26	B	.86	.65	.41	33.3
27	C	.76	.00	.01	00.0
28	B	.52	.49	.22	33.3
29	A	.81	.65	.47	33.3
30	D	.81	.45	.12	16.7
31	D	.76	.00	-.02	00.0
32	C	.81	.65	.28	33.3
33	C	.52	.97	.69	83.3
34	B	.81	.65	.33	33.3
35	B	.86	.45	.14	16.7

TABLE 11--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	A	.86	-.29	-.07	-16.7
37	D	.86	.45	.11	16.7
38	C	.57	-.29	-.07	-16.7
39	D	.52	.72	.39	50.0
40	B	.71	.00	.19	00.0
41	B	.90	.00	.24	00.0
42	C	.71	.29	.28	16.7
43	B	.81	.29	.06	16.7
44	C	.71	.52	.17	33.3

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the ralationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[e] Item 20 was not scored due to a typographical error.

TABLE 12

ITEM ANALYSIS: FORM C--FARM MANAGEMENT MASTERY TEST

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
1	B	.25	.32	.11	17.5
2	B	.11	.16	.26	7.5
3	D	.46	.16	.16	10.0
4	B	.61	.16	.25	10.0
5	B	.46	.20	.01	12.5
6	C	.57	.76	.43	55.0
7	A	.39	.65	.45	45.0
8	A	.46	.98	.59	90.0
9	C	.54	.87	.58	67.5
10	C	.86	.09	.09	5.0
11	D	.89	.31	.14	15.0
12	A	.39	.59	.32	37.5
13	A	.79	.49	.32	27.5
14	B	.75	.12	.22	7.5
15	C	.75	-.32	-.25	-17.5
16	D	.57	.16	.03	10.0
17	C	.86	-.16	-.08	- 7.5
18	C	.36	.20	.18	12.5
19	B	.75	.49	.34	27.5
20	D	.46	.98	.66	90.0
21	B	.39	.52	.42	35.0
22	D	.43	.05	.12	2.5
23	A	.29	.59	.44	37.5
24	B	.32	.25	.06	15.0
25	C	.36	.95	.65	80.0
26	C	.29	.47	.37	27.5
27	B	.64	-.05	.07	- 2.5
28	D	.79	.81	.65	50.0
29	A	.96	.00	.02	00.0
30	C	.21	.47	.39	27.5
31	B	.75	-.16	-.02	- 7.5
32	C	.75	.12	.06	7.5
33	C	.75	.64	.38	40.0
34	A	.64	.99	.66	87.5
35	B	.64	.95	.69	75.0

TABLE 12--Continued

Test Form and Item	Correct Option	Relative Difficulty[a]	Phi Coefficient[b]	Point Biserial Coefficient[c]	Discrimination Index[d]
36	A	.43	.76	.37	55.0
37	C	.25	.32	.22	17.5
38	B	.39	.68	.35	47.5
39	C	.18	.34	.16	10.0
40	B	.32	.47	.26	27.5
41	C	.00	.00	.00	00.0
42	D	.04	.34	.13	10.0
43	C	.32	.25	.21	15.0

[a] Percentage of students missing the item.

[b] A corrected phi correlation coefficient indicating an item to item relationship between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

[c] Point biserial correlation coefficient indicating the relationship of the item to the total score on the test; a measure of the validity of the item.

[d] The degree to which the item discriminates between the upper group (top 27.5 per cent of students based on total score) and the lower group (bottom 27.5 per cent of students based on total score).

TABLE 13

SUMMARY STATISTICS: AGRICULTURAL MECHANICS MASTERY TESTS

STATISTIC	FORM A	FORM B	FORM C
Number of Items	102	98	102
Number of Students	77	55	46
Mean Score	57.4	55.7	59.4
Median	58.0	57.0	61.0
Mode	58.0	57.0	62.0
Maximum Score	77.0	80.0	73.0
Minimum Score	31.0	14.0	41.0
Reliability Estimates			
Kuder-Richardson 20	.82	.88	.71
Kuder-Richardson 21	.76	.84	.58
Mean Item Difficulty[a]	.44	.43	.42
Mean Item Discrimination[b]	.24	.27	.19

[a] See Table 14 for item difficulty distribution.

[b] See Table 15 for item discrimination distribution.

TABLE 14

ITEM DIFFICULTY DISTRIBUTION: AGRICULTURAL MECHANICS MASTERY TEST

	Form A		Form B		Form C	
Item Difficulty Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	8	8	5	5	9	9
.61 - .80	20	20	17	17	20	20
.41 - .60	26	25	26	27	20	20
.21 - .40	29	28	28	29	24	24
.00 - .20	19	19	22	22	29	28

TABLE 15

ITEM DISCRIMINATION DISTRIBUTION: AGRICULTURAL MECHANICS MASTERY TEST

	Form A		Form B		Form C	
Item Discrimination Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	0	0	0	0	0	0
.61 - .80	2	2	3	3	2	2
.41 - .60	17	17	20	20	18	18
.21 - .40	36	35	43	44	25	25
.00 - .20	39	38	27	28	40	39
Below .00	8	8	5	5	17	17

TABLE 16

SUMMARY STATISTICS: HORTICULTURE MASTERY TESTS

STATISTIC	FORM AB-1	FORM AB-2	FORM AB-3
Number of Items	119	119	116
Number of Students	25	20	20
Mean Score	52.0	56.6	50.8
Median	49.0	52.0	54.0
Mode	46.0	52.0	33.0
Maximum Score	87.0	89.0	73.0
Minimum Score	22.0	30.0	30.0
Reliability Estimates			
Kuder-Richardson 20	.88	.90	.85
Kuder-Richardson 21	.84	.88	.82
Mean Item Difficulty[a]	.56	.52	.56
Mean Item Discrimination[b]	.26	.33	.28

[a] See Table 17 for item difficulty distribution.

[b] See Table 18 for item discrimination distribution.

TABLE 17

ITEM DIFFICULTY DISTRIBUTION: HORTICULTURE MASTERY TESTS

	Form AB-1		Form AB-2		Form AB-3	
Item Difficulty Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	15	13	7	6	11	9
.61 - .80	41	34	34	29	38	33
.41 - .60	32	27	45	38	38	33
.21 - .40	18	15	20	17	22	19
.00 - .20	13	11	13	11	7	6

TABLE 18

ITEM DISCRIMINATION DISTRIBUTION: HORTICULTURE MASTERY TESTS

	Form AB-1		Form AB-2		Form AB-3	
Item Discrimination Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	6	5	9	8	0	0
.61 - .80	3	3	14	12	12	10
.41 - .60	16	13	18	15	17	15
.21 - .40	48	40	17	14	25	22
.00 - .20	30	25	52	44	47	41
Below .00	16	13	9	8	15	13

TABLE 19

SUMMARY STATISTICS: AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TESTS

STATISTIC	FORM A	FORM B	FORM C
Number of Items	50	50	50
Number of Students	45	32	31
Mean Score	25.4	29.2	29.7
Median	26.0	30.0	31.0
Mode	26.0	34.0	32.0
Maximum Score	35.0	38.0	41.0
Minimum Score	11.0	13.0	16.0
Reliability Estimates			
Kuder-Richardson 20	.64	.70	.67
Kuder-Richardson 21	.50	.61	.54
Mean Item Difficulty[a]	.49	.42	.41
Mean Item Discrimination[b]	.23	.26	.25

[a] See Table 20 for item difficulty distribution.

[b] See Table 21 for item discrimination distribution.

TABLE 20

ITEM DIFFICULTY DISTRIBUTION: AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TESTS

	Form A		Form B		Form C	
Item Difficulty Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	7	14	4	8	5	10
.61 - .80	13	26	7	14	7	14
.41 - .60	9	18	12	24	13	26
.21 - .40	11	22	20	40	9	18
.00 - .20	10	20	7	14	16	32

TABLE 21

ITEM DISCRIMINATION DISTRIBUTION: AGRIBUSINESS SUPPLIES AND SERVICES MASTERY TESTS

	Form A		Form B		Form C	
Item Discrimination Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	0	0	0	0	1	2
.61 - .80	0	0	2	4	2	4
.41 - .60	9	18	17	34	9	18
.21 - .40	18	36	11	22	15	30
.00 - .20	18	36	15	30	14	28
Below - .00	5	10	5	10	9	18

TABLE 22

SUMMARY STATISTICS: FARM MANAGEMENT MASTERY TESTS

STATISTIC	FORM A	FORM B	FORM C
Number of Items	42	43	43
Number of Students	20	21	28
Mean Score	17.8	13.1	21.6
Median	17.0	13.0	21.0
Mode	17.0	13.0	18.0
Maximum Score	30.0	24.0	34.0
Minimum Score	9.0	3.0	14.0
Reliability Estimates			
Kuder-Richardson 20	.67	.62	.72
Kuder-Richardson 21	.58	.57	.63
Mean Item Difficulty[a]	.58	.70	.50
Mean Item Discrimination[b]	.29	.25	.27

[a] See Table 23 for item difficulty distribution.

[b] See Table 24 for item discrimination distribution.

TABLE 23

ITEM DIFFICULTY DISTRIBUTION: FARM MANAGEMENT MASTERY TESTS

	Form A		Form B		Form C	
Item Difficulty Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	6	14	16	37	4	9
.61 - .80	13	31	14	33	12	28
.41 - .60	12	29	11	26	9	21
.21 - .40	7	17	2	5	14	33
.00 - .20	4	10	0	0	4	9

TABLE 24

ITEM DISCRIMINATION DISTRIBUTION: FARM MANAGEMENT MASTERY TESTS

	Form A		Form B		Form C	
Item Discrimination Range	Number of Items	Percent of Items	Number of Items	Percent of Items	Number of Items	Percent of Items
.81 - 1.00	1	2	1	2	3	7
.61 - .80	0	0	1	2	3	7
.41 - .60	9	21	9	21	5	12
.21 - .40	9	21	12	28	9	21
.00 - .20	18	43	16	37	19	44
Below .00	5	12	4	9	4	9